HP ProLiant DL740 Server Maintenance and Service Guide

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About This Guide

This maintenance and service guide can be used for reference when servicing the HP ProLiant DL740 server**.**

⚠ **WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs can create conditions that are hazardous.**

Audience Assumptions

This guide is for service technicians. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazard in products with hazardous energy levels and are familiar with weight and stability precautions for rack installations.

Technician Notes

⚠ **WARNING: Only authorized technicians trained by HP should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module-level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.**

⚠ **WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, do not exceed the level of repairs specified in these procedures. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create conditions that are hazardous.**

⚠ **WARNING: To reduce the risk of electric shock or damage to the equipment:**

- **Disconnect power from the system by unplugging all power cords from the power supplies.**

- **Do not disable the power cord grounding plug. The grounding plug is an important safety feature.**

- **Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.**

> ⚠ **CAUTION:** To properly ventilate the system, you must provide at least 7.6 cm (3.0 in.) of clearance at the front and back of the server.

> ⚠ **CAUTION:** The computer is designed to be electrically grounded (earthed). To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

NOTE: Any indications of component replacement or printed wiring board modifications may void any warranty.

Access Panel Labels

A significant amount of server configuration and options installation information is provided on the panel labels. As shown in Figure 1, these labels are located on the top of the unit.

NOTE: These labels do not contain warning and caution information. Refer to this guide or to the option documentation for the applicable warnings and cautions.
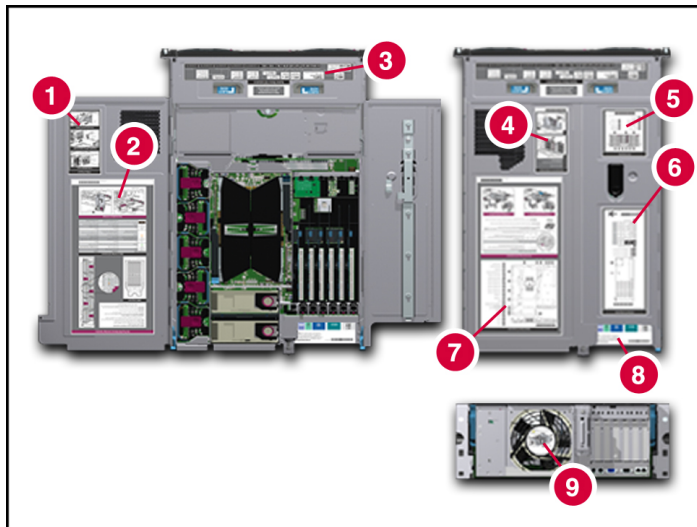
Figure 1: Location of server labels

Table 1: Location of Server Labels

Item	Component	Item	Component
1	I/O board removal label	6	I/O board configuration label
2	Hot Plug RAID Memory cartridge operation label	7	System board components label
3	System status LED indicators label	8	Rear connectors label
4	Removing power and media module label	9	Removing host module label
5	Front components label		

Related Documents

For additional information on the topics covered in this guide, refer to the following documentation:

- Rack Resource Kits are included with the racks and include the following (depending on rack model):

  — Rack Products Documentation CD—Available on the HP website or included with the Rack Resource Kit.

  — 10000 Series Rack Resource Kit—Included with all HP 10000 Series racks.

  — 9000 Series Products Audio-Visual (AV) CD Kit—Included with the Compaq branded 9000 Series Rack Resource Kit.

  — The Rack 7000/4000 Series Rack Resource Kit—Included with all Compaq branded 7000 and 4000 Series racks.

  — Rack Builder Online—Available on the HP website. Instructions on how to access and use this online tool are included in the Rack Resource Kit.

- Documentation included on the Documentation CD:

  — *Smart Array 5i Controller User Guide*

  — *ROM-Based Setup Utility User Guide*

  — *HP ProLiant Servers Troubleshooting Guide*

  — *PCI Hot Plug Administration Guide*

  — *Remote Insight Lights-Out Edition II User Guide*

  — *Server Online Reference Guide*

- ProLiant DL740 Power Calculator—Available on the ActiveAnswers website at

  activeanswers.compaq.com/

Where to Go for Additional Help

In addition to this guide, the following information sources are available:

- User documentation
- *Service Quick Reference Guide*
- Service training guides
- Service advisories and bulletins
- QuickFind information services
- Insight Manager software

Integrated Management Log

The server includes an integrated, nonvolatile management log that contains fault and management information. The contents of the Integrated Management Log (IML) can be viewed with Insight Manager.

Telephone Numbers

For the name of the nearest HP authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.

For HP technical support:

- In the United States and Canada, call 1-800-652-6672.
- Outside the United States and Canada, refer to
  www.hp.com

1

Illustrated Parts Catalog

This chapter provides the illustrated parts breakdown and a spare parts list for the HP ProLiant DL740 server. See the table following each illustration for the names of referenced spare parts.

System Chassis
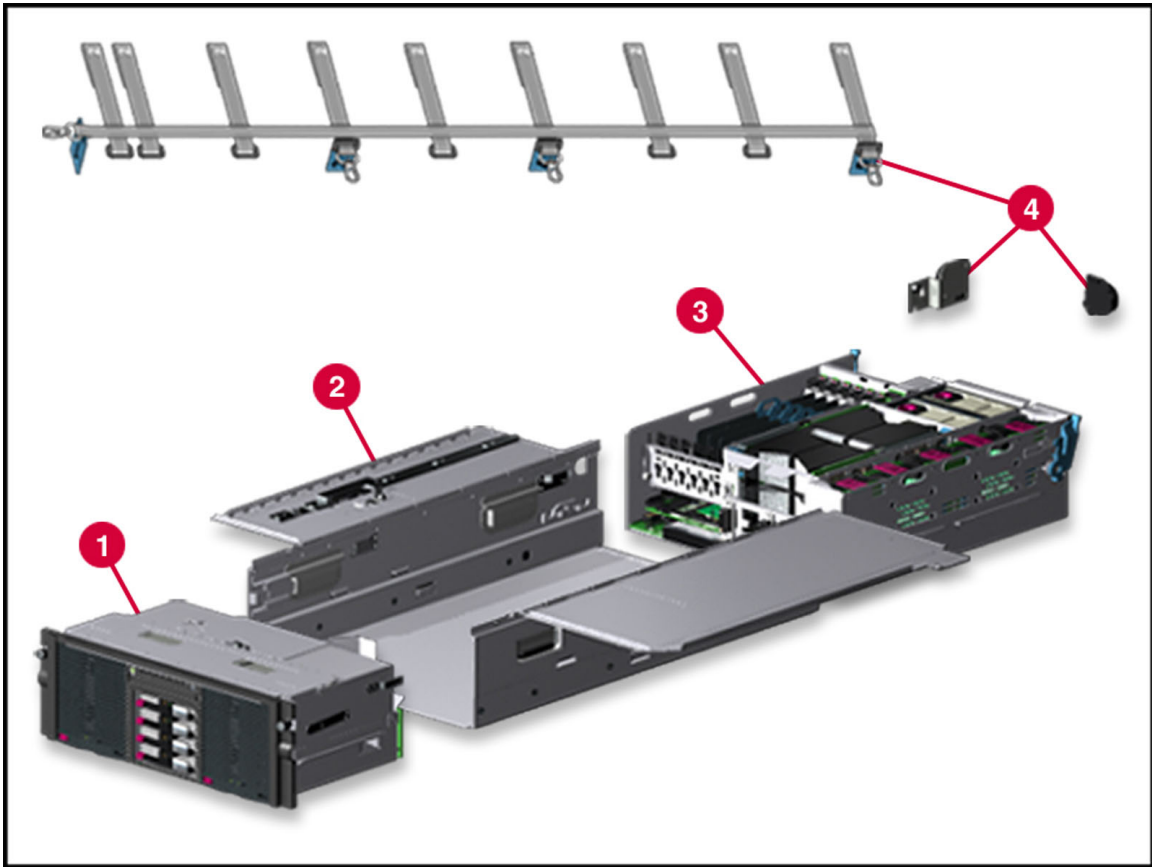
Figure 1-1: System chassis exploded view

Table 1-1: System Chassis Spare Parts List

Item	Description	Spare Part Number
System Chassis		
1	Power and media module	
2	System chassis with access panels	
3	Host module without PCI-X riser	280612-001
Assemblies		
4	Cable management system reel assembly and rails	280620-001
4a	Cable management arm*	326779-001
4b	Cable management/Velcro*	342294-001
*Not shown		

Power and Media Module
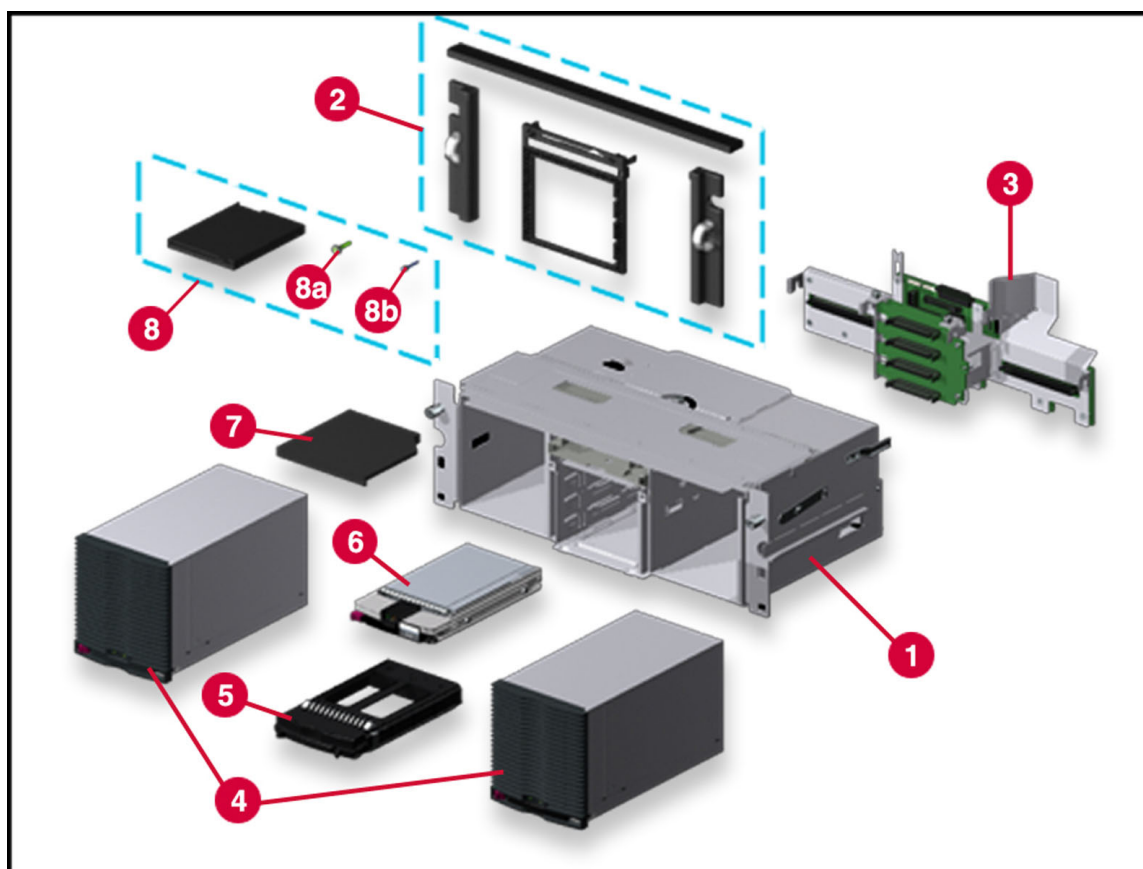
Figure 1-2: Power and media module exploded view

Table 1-2: Power and Media Module Spare Parts List

Item	Description	Spare Part Number
Power and Media Module Components		
1	Power and media module chassis	
2	Power and media module bezel	
3	Backplane board	280618-001
4	Power supplies	285381-001

Table 1-2: Power and Media Module Spare Parts List *continued*

Item	Description	Spare Part Number
Mass Storage		
5	LVDS 1-inch hard drive blank	313046-001
6	Wide Ultra3 hard drive with tray, 18.2-GB, 1-inch, 10000 rpm	152190-001
	Wide Ultra3 hard drive with tray, 36.4-GB, 1-inch, 10000 rpm*	177986-001
	Wide Ultra3 hard drive with tray, 18.2-GB, 1-inch, 15000 rpm*	189395-001
	U320 Universal hard drive with tray, 36.4-GB, 1-inch, 10000 rpm*	289041-001
	U320 Universal hard drive with tray, 72.8-GB, 1-inch, 10000 rpm*	289042-001
	U320 Universal hard drive with tray, 146.8-GB, 1-inch, 10000 rpm*	289044-001
	U320 Universal hard drive with tray, 18.2-GB, 1-inch, 15000 rpm*	289240-001
	U320 Universal hard drive with tray, 36.4-GB, 1-inch, 15000 rpm*	289241-001
	U320 Universal hard drive with tray, 72.8-GB, 1-inch, 10000 rpm*	289243-001
7	DVD drive	268795-001
8	1.44-MB diskette drive with mechanicals	280617-001
	a) Power On/Standby LED	
	b) UID LED	
*Not shown		

Host Module
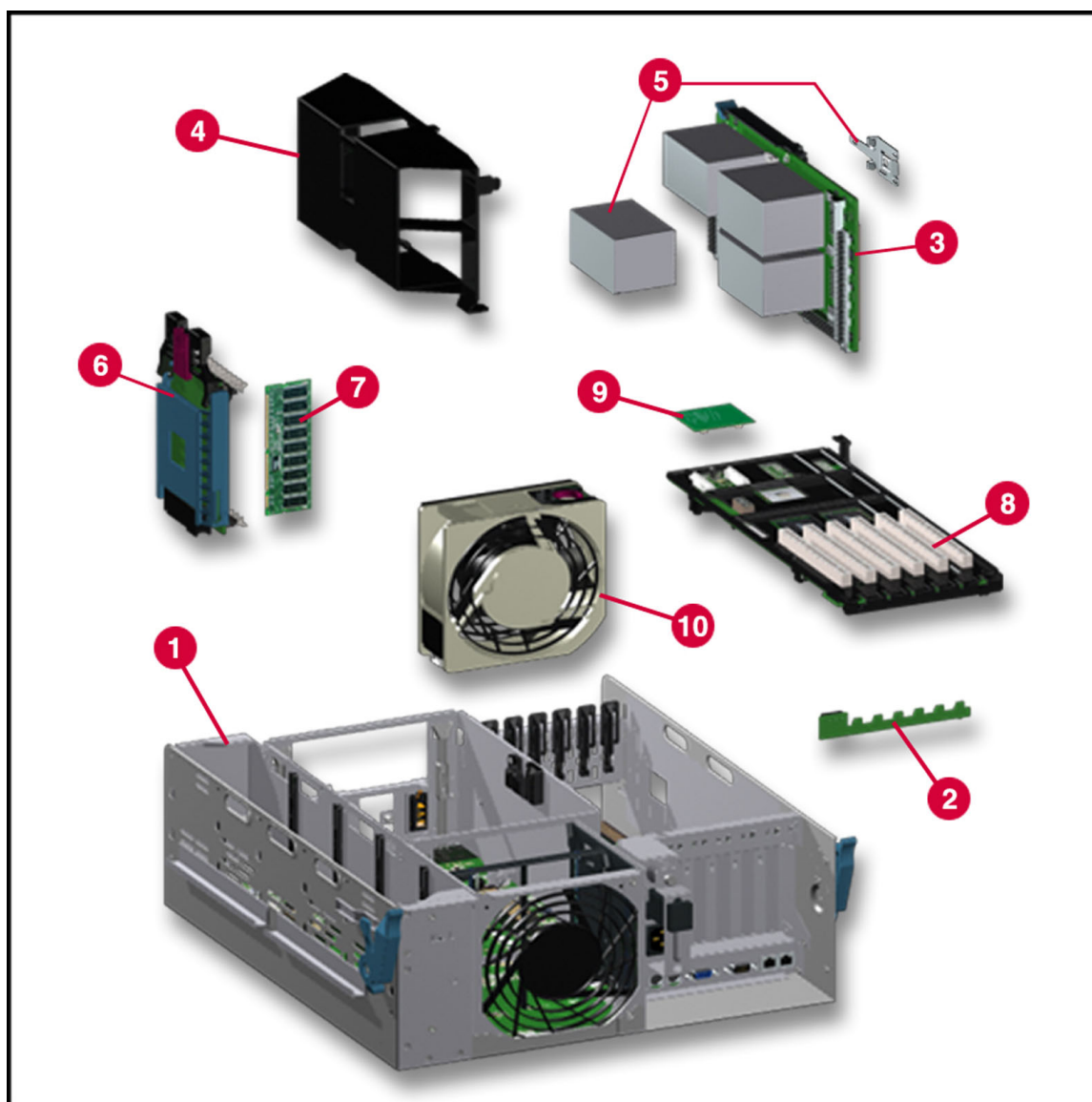
Figure 1-3: Host module exploded view

Table 1-3: Host Module Spare Parts List

Item	Description	Spare Part Number
Host Module Components		
1	Host module chassis	
2	PCI-X Hot Plug switchboard with cable	280615-001
3	Processor board	314379-001
4	Processor board cover	320104-001
Processors		
5	Processor (1.5 GHz with 1-MB cache), clip, and heatsink	319952-001
	Processor (2.0 GHz with 1-MB cache), clip, and heatsink*	327839-001
	Processor (2.0 GHz with 2-MB cache), clip, and heatsink*	319953-001
	Processor (2.2 GHz with 2-MB cache), clip, and heatsink*	352311-001
	Processor (2.5 GHz with 1-MB cache), clip, and heatsink*	327840-001
	Processor (2.7 GHz with 2-MB cache), clip, and heatsink*	352312-001
	Processor (2.8 GHz with 2-MB cache), clip, and heatsink*	327841-001
	Processor (3.0 GHz with 4-MB cache), clip, and heatsink*	352313-001
	Reserved	
Memory		
6	Hot-plug memory cartridge	280613-001
7	Memory module, 256MB, PC133, 128Mb, ECC SDRAM DIMM	159377-001
	Memory module, 512MB, PC133, 256Mb, ECC SDRAM DIMM*	177628-001
	Memory module, 1GB, PC133, 256Mb, LP, ECC SDRAM DIMM*	321851-001
	Memory module, 2GB, PC133, 512Mb, ECC SDRAM DIMM*	321852-001
Miscellaneous		
8	PCI-X slot board	280614-001
9	Array enabler board	122232-001
10	Hot-plug I/O fan	280619-001
	Miscellaneous cables*	280623-001
	a) 3.5 in LNG, no twist	
	b) Power, 6.5 in	
	c) Hot-Plug, PCI	
	d) LED board, flex	
	e) Power switch	
	f) Cord, AC, 10 A, 9 ft	
*Not shown		

Miscellaneous

Table 1-4: Miscellaneous Spare Parts List

Item	Description	Spare Part Number
	Miscellaneous plastics*	280624-001
	a) Guide, card, processor	
	b) Puller assembly, PCI, LV	
	c) Receptacle, interconnect, AC	
	d) Guide, memory	
	e) Gear, rack, processor	
	f) Guide, fan	
	g) Lightpipe, fan	
	h) Divider, upper fan	
	i) Ejector, right	
	j) Ejector, left	
	k) Grill, exhaust, chassis rear	
	l) Retainer, cardguide, PCI, CBN (quantity 9)	
	m) Assembly, PCI latch and base, PCI, CBN	
	n) Baffle, power backplane	
	o) Assembly extraction tool	
	LED display board	280616-001
	Internal battery*	179322-001
	Ethernet loopback RJ-45*	317465-001
	Return kit*	333783-001

*Not shown

2

Service Preparation

Safety Considerations

Before performing service procedures, review the following safety information.

Electrostatic Discharge Information

A discharge of static electricity can damage static-sensitive devices or microcircuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. To prevent electrostatic damage, observe the following precautions:

- Transport products in static-safe containers, such as conductive tubes, bags, or boxes.

- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.

- Cover workstations with approved static-dissipating material. Use a wrist strap connected to the work surface and properly grounded tools and equipment.

- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and foam packing.

- Be sure you are always properly grounded when touching a static-sensitive component or assembly.

- Avoid touching pins, leads, or circuitry.

- Always place drives PCB assembly-side down.

- Use conductive field service tools.

Rack Warnings and Precautions

⚠ **WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:**

- **The leveling jacks are extended to the floor.**

- **The full weight of the rack rests on the leveling jacks.**

- **The stabilizers are attached to the rack if it is a single-rack installation.**

- **The racks are coupled in multiple-rack installations.**

- **Only one component is extended at a time. A rack can become unstable if more than one component is extended for any reason.**

⚠ **CAUTION:** Always begin by mounting the heaviest item in the bottom of the rack. Continue to populate the rack from the bottom to the top.

Server Warnings and Precautions

⚠ **WARNING: The HP ProLiant DL740 server weighs 61 kilograms (135 pounds) when fully assembled. To reduce the risk of personal injury or damage to the equipment:**

48-61 kg
105-135 lb

- **Observe local health and safety requirements and guidelines for manual material handling.**

- **Obtain adequate assistance to lift and stabilize the product during installation or removal.**

- **Remove all modules and power supplies to reduce the overall weight of the product.**

⚠ **WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs could create hazardous conditions.**

⚠ **WARNING: To reduce the risk of personal injury from hazardous energy or damage to the equipment when working on energized servers**:

- **Remove all watches, rings, and any other loose-fitting jewelry.**

- **Do not use conductive tools inside the server that could bridge live parts.**

⚠ **WARNING: To reduce the risk of electric shock or damage to the equipment:**

- **Do not disable the power cord grounding plug. The grounding plug is an important safety feature.**

- **Plug the power cord into a grounded electrical outlet that is easily accessible at all times.**

- **Install the power supply before connecting the power cord to the power supply.**

- **Unplug the power cord before removing the power supply from the server.**

- **If the system has multiple power supplies, disconnect power from the system by unplugging all power cords from the power supplies.**

⚠ **WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.**

⚠ **CAUTION:** Because the HP ProLiant DL740 server does not have safety interlocks, it is possible for a unit to be operated without the cover and air baffles properly installed. This could cause thermal damage in the system and could void the warranty. The rack-mountable HP ProLiant DL740 server should always be operated with the system unit cover on. Proper cooling cannot be achieved if the system unit cover is removed for extended periods of time.

⚠ **CAUTION:** Protect the server from power fluctuations and temporary interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system in operation during a power failure.

Server Modules

In the HP ProLiant DL740 server, options and accessories are easily accessed through top access panels and two removable modules: the power and media module, and the host module. See Figure 2-1, Figure 2-2, and Figure 2-3 for identification of these modules and other components.
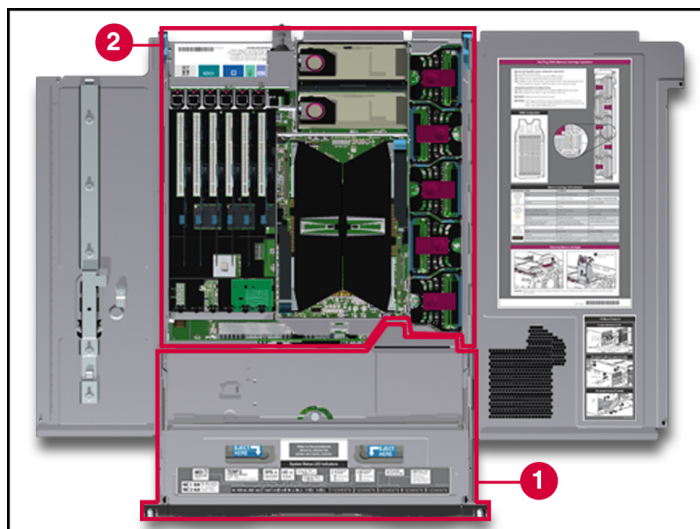
Figure 2-1: Server modules

Item	Description
1	Power and media module
2	Host module
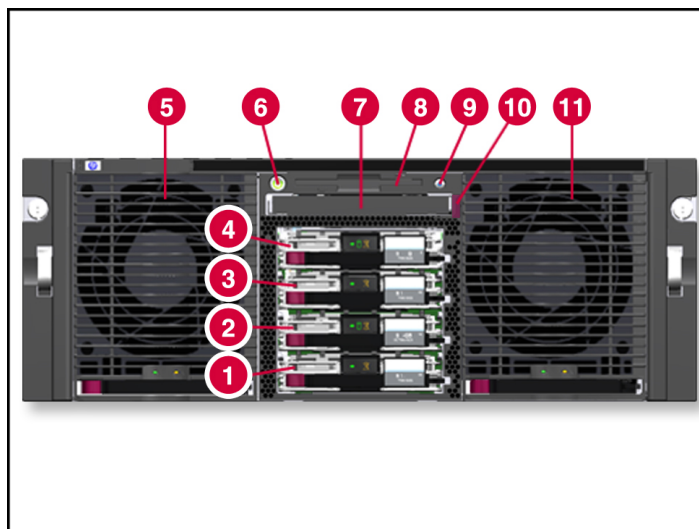
Figure 2-2: Power and media module components

Item	Description
1	Ultra3 hard drive SCSI ID 0
2	Ultra3 hard drive SCSI ID 1
3	Ultra3 hard drive SCSI ID 2
4	Ultra3 hard drive SCSI ID 3
5	Power supply 1
6	Power On/Standby switch
7	DVD-ROM drive
8	1.44-MB diskette drive
9	Unit identification LED switch
10	Media bay eject button
11	Power supply 2
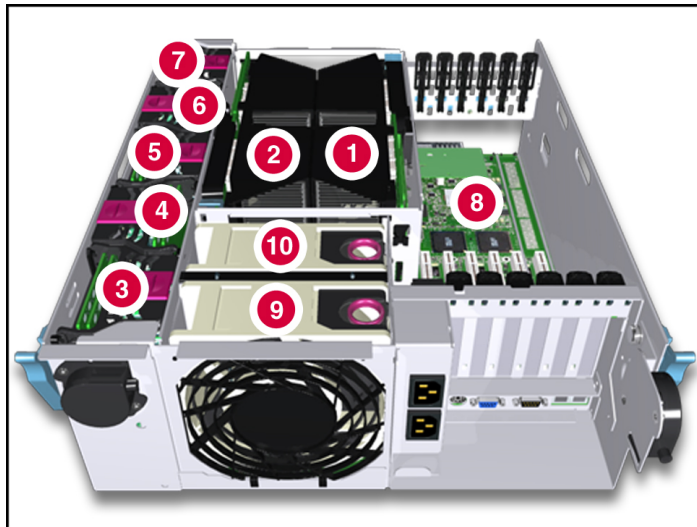
Figure 2-3: Host module components

Item	Description
1	Processor board 1
2	Processor board 2
3	Memory cartridge 1
4	Memory cartridge 2
5	Memory cartridge 3
6	Memory cartridge 4
7	Memory cartridge 5
8	I/O board
9	System fan 2
10	System fan 1

For details on cable connections, refer to Chapter 6 in the *HP ProLiant DL740 Server User Guide.*

Table 2-1 describes the contents of the modules and how to access the components.

Table 2-1: Module Components and Access

Module	Contents	To Access
Host module	PCI Hot Plug expansion slots	Open the top access panels.
	Configuration switches	Open the top access panels.
	Fans 1 and 2	Open the top access panels.
	Processor boards	Open the top access panels, open the processor board cover, and remove the processor boards.
	Memory (DIMMs)	Open the top access panels and remove the memory cartridge.
Power and media module	Power supply 1 and 2	Access directly at the front of the server.
	Media bay	Access directly at the front of the server.
	Hot-plug hard drives	Access directly at the front of the server.

Preparation Procedures

To access some components and perform certain service procedures, you must do one or more of the following:

- Extend the server from the rack.

  If you are performing service procedures in an HP rack or third-party rack cabinet, use the locking feature of the rack rails to support the server and gain access to internal components.

- Power down the server.

  If you must remove a server from a rack or a non-hot-plug component from a server, power down the server.

- Remove the server from the rack.

  If the rack environment, cabling configuration, or server location in the rack creates awkward conditions, remove the server from the rack.

To service the HP ProLiant DL740 server, you might need the following:

- Flat-blade screwdriver (4 mm)

- Torx T-15 screwdriver

- T8 screwdriver

- Phillips screwdriver

- HP SmartStart CD:

  — Drive Array Advanced Diagnostics (DAAD) software

  — Array Diagnostics Utility (ADU) software

  — ROM-Based Inspect Utility

  — ROM-Based Diagnostics

System Interconnect LEDs

The system interconnect LEDs on the ProLiant DL740 server provide a closed-loop checking mechanism for verifying proper component mating and interconnections between critical server components. LEDs inside the front of the server provide visual assistance in isolating components to check if the server will not power up due to a component or module that is not fully installed. If a status indicator LED is illuminated, reseat the component represented by the LED. Refer to the hood labels for component location. See Chapter 7 for more information.

Hot-Plug Procedures

You can perform some service procedures without powering down the server. Before performing hot-plug procedures, observe the following guidelines:

- For hot-plug fan procedures, be sure that the fan zone is fully populated.

- For hot-plug power supply procedures, be sure that a redundant power supply is installed and connected to a power source.

- For hot-plug drive procedures, determine whether the drive is part of an array. For more information, refer to the "Hot Plug SCSI Hard Drive Replacement Guidelines" in the *HP Servers Troubleshooting Guide.*

- For hot-plug expansion board procedures, ensure that the proper drivers for the PCI Hot Plug functionality are installed. For more information, refer to the *HP ProLiant DL740 Server User Guide*.

The access panels can be removed while the server is powered up without causing a system shutdown. When the server is in Standby mode, portions of the power supply, auxiliary power (+5 V), and some internal circuitry remain active.

Non-Hot-Plug Procedures

You must power down the server to perform non-hot-plug procedures.

⚠ **WARNING: To reduce the risk of electric shock or damage to the equipment, disconnect power from the server by unplugging all power cords from either the electrical outlet or the server. In systems with multiple power supplies, you must disconnect all the power cords to completely remove power from the system.**

IMPORTANT: You must be knowledgeable about electrostatic discharge information before conducting the preparation procedures. For electrostatic discharge information, see "Electrostatic Discharge Information" in this chapter.

Powering Down the Server

System power in the HP ProLiant DL740 server does not completely shut off with the front panel Power On/Standby switch. The switch toggles between on and standby, rather than on and off. The Standby position provides auxiliary power (+5V) and removes main power from most electronics and the drives, but portions of the power supply, the system interlock circuitry, and some internal circuitry remain active. You **must** disconnect all power cords from the server to completely remove all power from the system.

To power off the server:

1. Back up the server data.

2. Shut down the operating system as directed by the operating system instructions.

3. If the operating system does not power the system down, press the Power On/Standby switch to Standby, thereby disabling the main power supply output and providing auxiliary power (+ 5 V) to the server. Standby does not disable auxiliary power.

4. Be sure that the system LED on the front panel, near the Power On/Standby switch, turns off and fan noise abates.
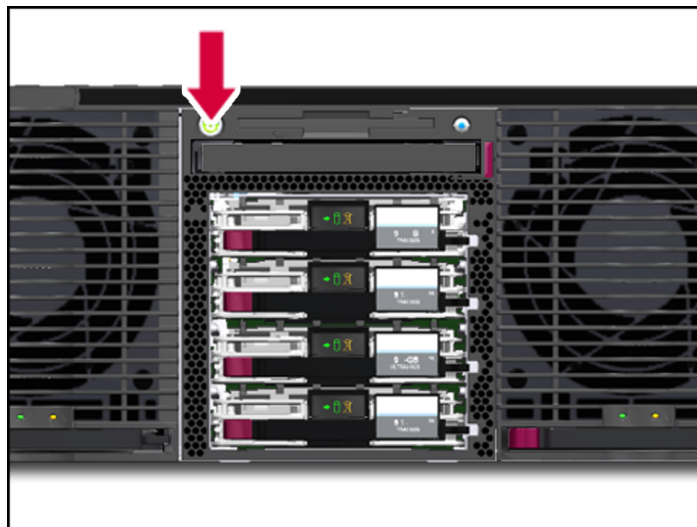

Figure 2-4: System power LED and switch

5. Disconnect all power cords from the server to disable power to the server.

For some removal and replacement procedures, you must remove the server from the rack and place it on a sturdy table or workbench. Refer to the *HP ProLiant DL740 Server User Guide* for further instructions.

Powering Up the Server

When you power up the server, it should go through the following sequence. Record any discrepancies and error messages that occur. Be sure that the server is safely installed in an adequate environment before powering up for the first time.

Be sure that AC power is supplied to each power supply on the back of the server. The left LEDs on the power supplies blink green if AC power is supplied.

1. Turn on the machine by pressing the Power On/Standby switch. The system power LED is integrated into the Power On/Standby switch.

2. Check the system power LED:

   — The system power LED should blink to indicate that the system is powering up. If the LED does not blink when the power button is pressed, then one of the system components is improperly installed or no main power is applied to the system power supplies.

   — If the system power LED is amber, check the system interconnect status indicators, explained in the "System Interconnect LEDs" section of this chapter.

   — The system power LED blinks every one to two seconds. This action indicates that the Power/On Standby switch has been pressed and that the system will power up momentarily.

3. The power supplies' left LED blinks green as soon as AC power is applied to the rear of the server. This also signifies that the power supplies are providing the system with auxiliary power.

   — If the power supplies' left LED is not on or blinking, the server will not power up. Check the AC connection.

   — When the left LED illuminates solid green, listen for the fans to start.

4. The system activity LEDs (NIC1, NIC2, and Media) begin to blink in sequence until the memory initialization is complete.
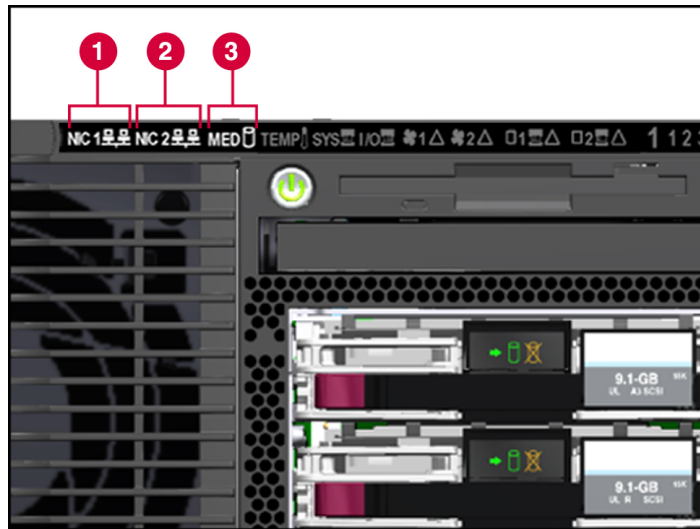
Figure 2-5: System activity LEDs

5. Check the hard drive LEDs on the front of the server. The hard drive LEDs should blink. If the LEDs do not light, verify that the hard drives are fully installed in the system and that the array bypass is initialized.

6. Check the DIMM status LEDs. The DIMM status LEDs for each cartridge will illuminate solid and then go out in sequence, beginning with cartridge 1 and ending with cartridge 5 (left to right cartridges 1, 2, 3, 4, 5).

7. Watch for memory system initialization. The memory system initializes as the memory cartridge power LEDs on all five memory cartridges begin blinking. After the memory system is initialized, all memory cartridge power LEDs will illuminate solid.

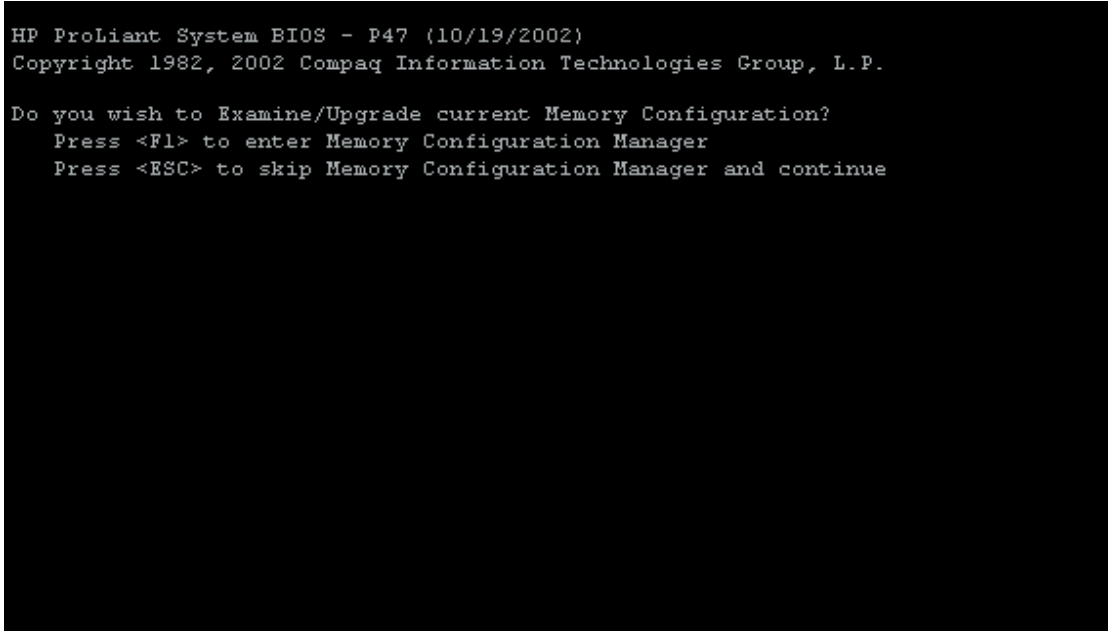8. The server begins the Power-On Self-Test (POST) sequence.

Power-On Self-Test (POST)

As the POST process continues during server power-up, you need to check the monitor for the following information, displayed in sequence:

1. HP initialization screen

2. System ROM family and date

3. Memory initialization, memory detected, and redundant memory

The system briefly displays the **F1** prompt to open the Memory Configuration Manager.


```
HP ProLiant System BIOS - P47 (10/19/2002)
Copyright 1982, 2002 Compaq Information Technologies Group, L.P.

Do you wish to Examine/Upgrade current Memory Configuration?
   Press <F1> to enter Memory Configuration Manager
   Press <ESC> to skip Memory Configuration Manager and continue
```

Figure 2-6: System F1 prompt
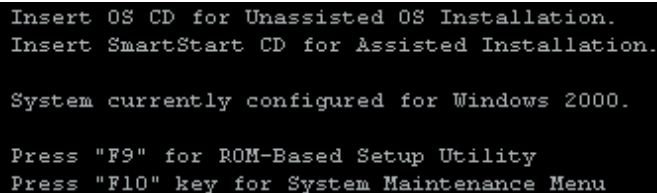
Press the **F1** key to enter the Memory Configuration Manager. This ROM-based tool, shown in Figure 2-7, is used to examine and upgrade the server memory configuration.
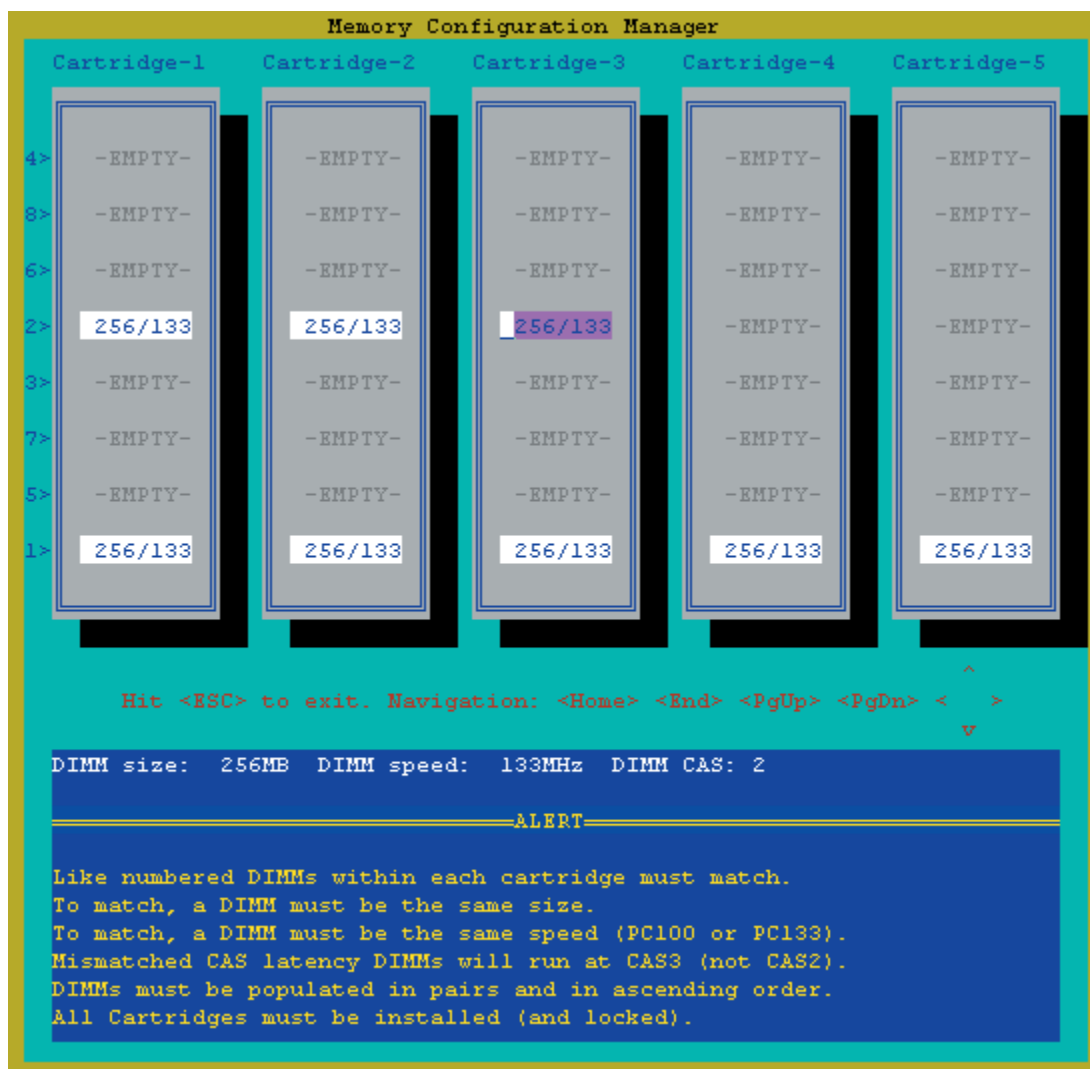
Figure 2-7: Memory Configuration Manager

4. Processor initialization information. The number, speed, and cache size of each processor is listed as it initializes.

5. The system briefly displays the **F8** prompt to configure the iLO using iLO RBSU.

6. Storage controller information. The system briefly displays the **F8** prompt after each controller POST to open the Option ROM Configuration for Arrays (ORCA).

7. The system briefly displays the **F9** and **F10** prompts.

```
Insert OS CD for Unassisted OS Installation.
Insert SmartStart CD for Assisted Installation.

System currently configured for Windows 2000.

Press "F9" for ROM-Based Setup Utility
Press "F10" key for System Maintenance Menu
```

Figure 2-8: System prompts

Press the **F9** key to start RBSU or the **F10** key to open the **System Maintenance Menu**.

Re-entering the Server Serial Number

After you replace the server host module or clear the NVRAM, you must re-enter the server serial number. To re-enter the serial number:

1. During the server startup sequence, press the **F9** key to access RBSU.

2. Select the **System Options** menu.

3. Select **Serial Number**. The following warning is displayed:

   WARNING! WARNING! WARNING! The serial number is loaded into the system during the manufacturing process and should NOT be modified. This option should ONLY be used by qualified service personnel. This value should always match the serial number sticker located on the chassis.

   Press the **Enter** key to clear the warning.

4. Enter the serial number and press the **Enter** key.

5. Press the **Escape** key to close the menu.

6. Press the **Escape** key to exit RBSU.

7. Press the **F10** key to confirm exiting RBSU. The server will automatically reboot.

3

Chassis Components Removal and Replacement Procedures
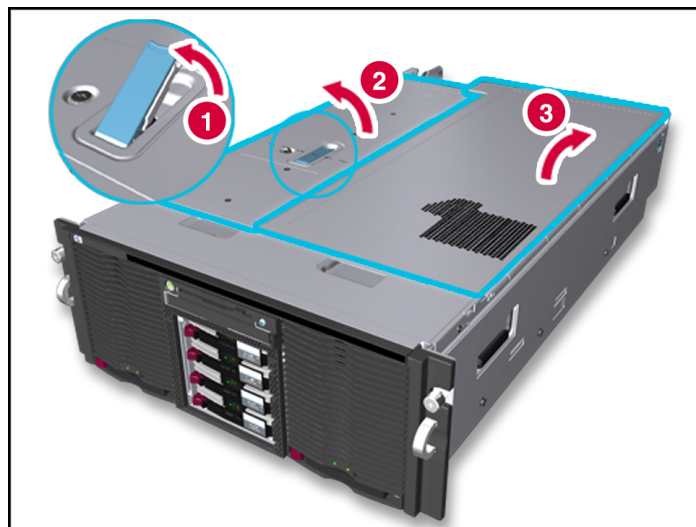
Top Access Panels

⚠️ **WARNING:** To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

△ **CAUTION:** When the server is powered on, the access panels must be installed for proper system cooling. Otherwise, component stress and permanent equipment damage can result.

Open the top access panels to access the PCI Hot Plug expansion slots, system fans, and configuration switches.

1. Slide the chassis out of the rack.

2. Unlock the top latch security screw and raise the latch (1), as shown in Figure 3-1. Hold down the top right access panel and lift the top left access panel (2). Then lift the top right access panel (3).


Figure 3-1: Opening the top access panels

NOTE: HP recommends leaving the top access panels locked during normal use.

Cable Management System

The cable management system is installed on the back of the server mounted in the rack and consists of two cable management system reel assemblies and a cable management system harness.

To remove the cable management system:

1. Detach the cable harness hook 5 for the loop labeled 5 on the server rail.

2. Detach the cable harness hook 4 from reel 4.

3. Detach the cable harness hook 3 from reel 3.

4. Unwrap the server cables and all of the short straps labeled 2 from the cable bundle.

5. Disconnect the power cords and peripheral devices such as the keyboard, mouse, and monitor.

6. Disconnect the cable harness hook 1 from the loop labeled 1 on the server chassis.

7. Loosen the thumbscrew (1) and remove the reel labeled 4 to the right side of the server chassis (2).
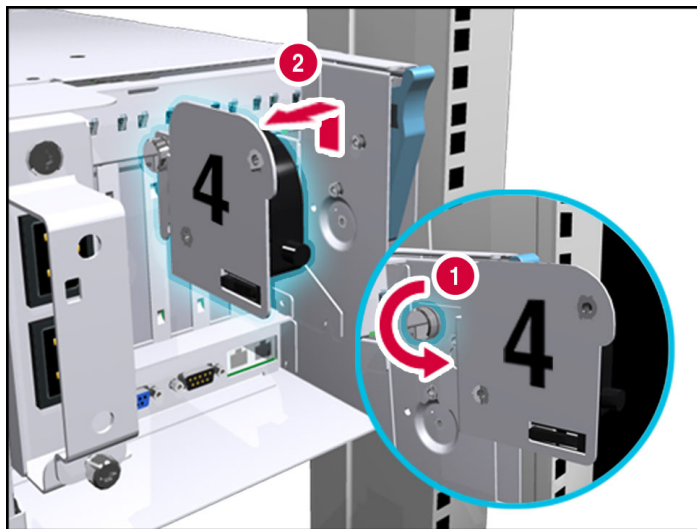
Figure 3-2: Removing reel 4

8. Rotate the second reel, labeled 3, until it unlocks and remove it from the left of the server chassis.
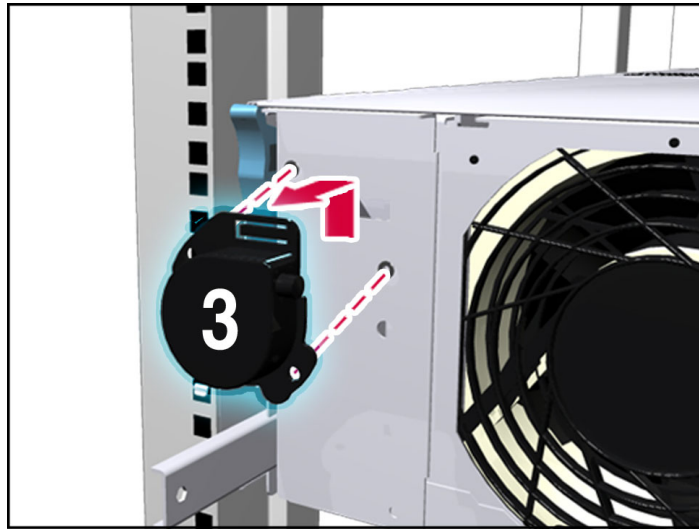
Figure 3-3: Removing reel 3

To reinstall the cable management system, reverse steps 1 through 8.

4

Host Module Removal and Replacement Procedures

Host Module

The host module is located at the rear of the server. Remove it to replace or service non-hot-plug components or to access other components in the host module.

IMPORTANT: You must re-enter the server serial number through RBSU after you replace the host module. Refer to the "Re-entering the Server Serial Number" section in Chapter 2.

Removing the Host Module

Use the appropriate procedures in this chapter to install or replace hot-plug fans or PCI/PCI-X Hot Plug expansion boards. To replace or service non-hot-plug components or address problems in the host module, remove the module from the chassis.

⚠ **WARNING: The host module weighs more than 15.88 kg (35 lbs). HP recommends either removing both processor boards or all of the memory cartridges before handling the module, or having two people handle the module together.**

△ **CAUTION:** Do not attempt to remove the host module while power is applied to the system. The host module is not hot-pluggable. Immediate system shutdown and data loss will occur.
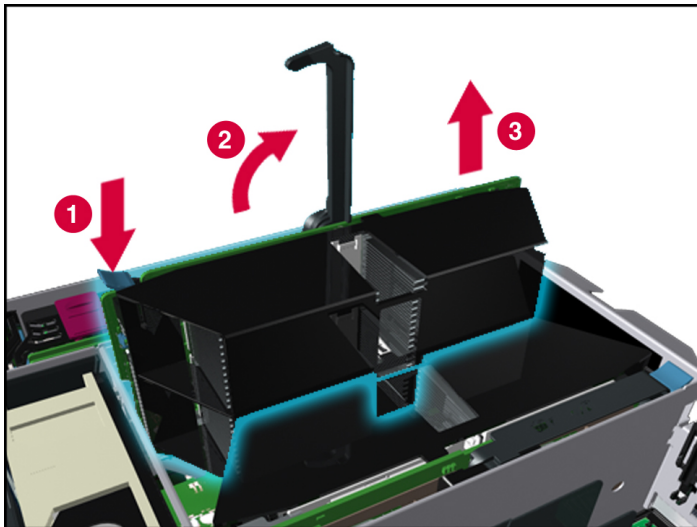
To remove the host module from the chassis:

1. If the computer is on, place the computer in Standby mode and disconnect the power cords. Refer to Chapter 7 for more information.

2. If you are replacing an item, it might be necessary to remove all of the cables connected to the I/O expansion boards. Disconnect the cable management system harness from the server. Refer to Chapter 3.

3. Open the top access panels to gain access to the host module and the processor boards. HP recommends removing the processor boards to lighten the module.

⚠ **WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.**

4. Push down the processor board lever latch to release the lever (1).

5. Lift up the processor board lever to release the board (2), and lift the processor board out of the module (3).

Figure 4-1: Removing the processor board

6. Push in on the sides of the cam levers on the host module (1), and rotate the top of the levers downward (2), as shown in Figure 4-2.

7. Pull the host module out of the chassis (3).

Figure 4-2: Releasing the host module

8. Set the host module aside for servicing non-hot-plug components.

⚠ **WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.**
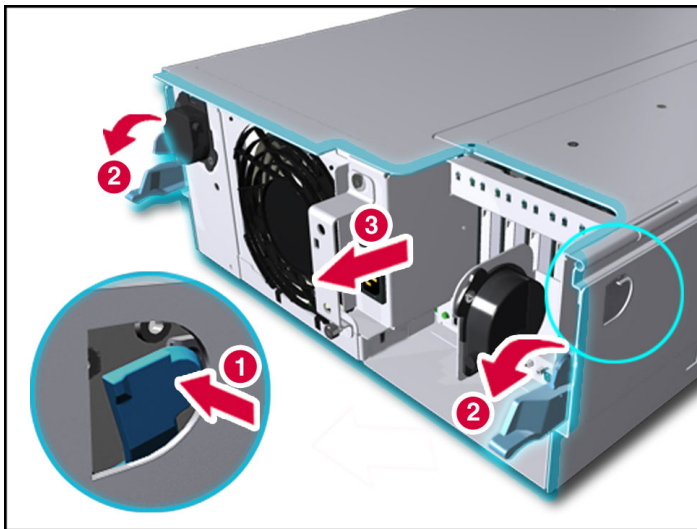
NOTE: Top panel labels provide instructions about installing expansion boards, setting switches, and installing hot-plug fans, along with information about PCI Hot Plug. Refer to Chapter 5 for hot-plug procedures.

To reassemble the server:

1. Slide the module in until the cam levers begin to rotate. Then push the cam levers shut until they snap into place.

2. Reinstall the processor boards.

3. Reinstall the cable management system harness and I/O cables in the reverse order from the steps used to remove them.

Processor Boards and Processors

Identifying

The ProLiant DL740 server is capable of supporting up to eight Intel® Xeon processors and is shipped with four or eight processors already installed. The ProLiant DL740 server supports two processor boards located in the host module.
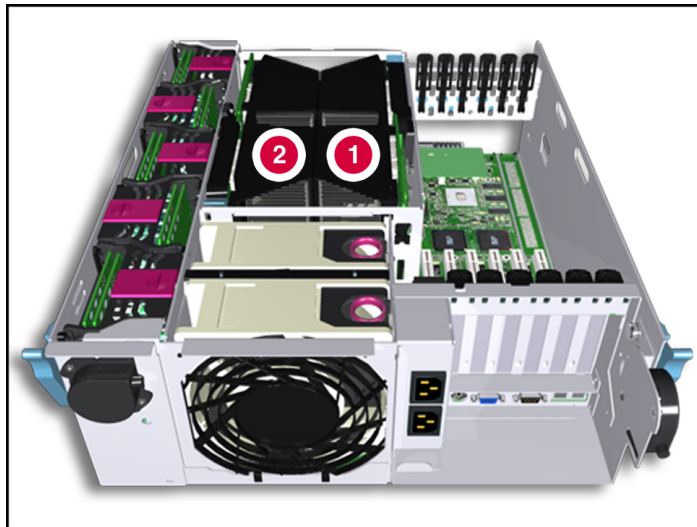
Figure 4-3: Processor boards

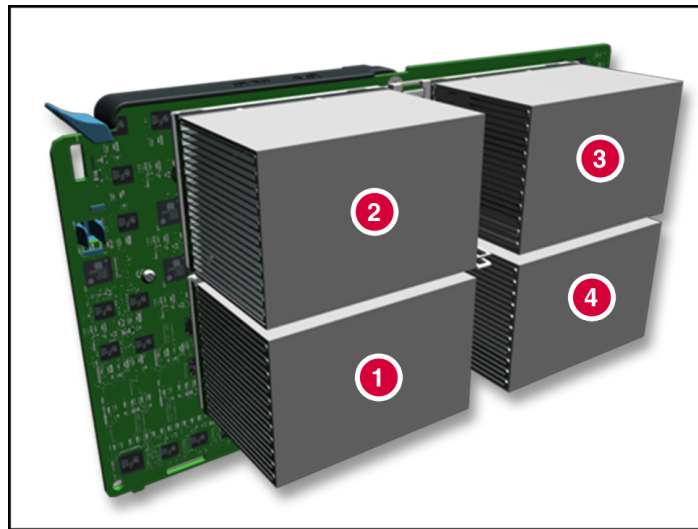| Item	Description
1	Processor board in processor board slot 1
2	Processor board in processor board slot 2

The ProLiant DL740 server supports four or eight Intel Xeon processors MP.

- All processors must be the same speed, cache size, and stepping.

  NOTE: Stepping refers to the processor revision.

- Processor board slot 1 must always be populated with a processor board to properly terminate the processor bus.

NOTE: If the server has one processor board (four processors), processor board slot 2 is populated with a processor board air baffle. This baffle must be removed to install the second processor board. Refer to the instructions included with the processor board option for more information.

Figure 4-4: Processors

Item	Description
1	Intel Xeon processor MP in socket 1
2	Intel Xeon processor MP in socket 2
3	Intel Xeon processor MP in socket 3
4	Intel Xeon processor MP in socket 4

Removing Processor Boards and Processors

> ⚠ **WARNING: The host module weighs more than 15.88 kg (35 lbs). HP recommends either removing ALL of the memory cartridges before handling the module or having two people handle the module together.**
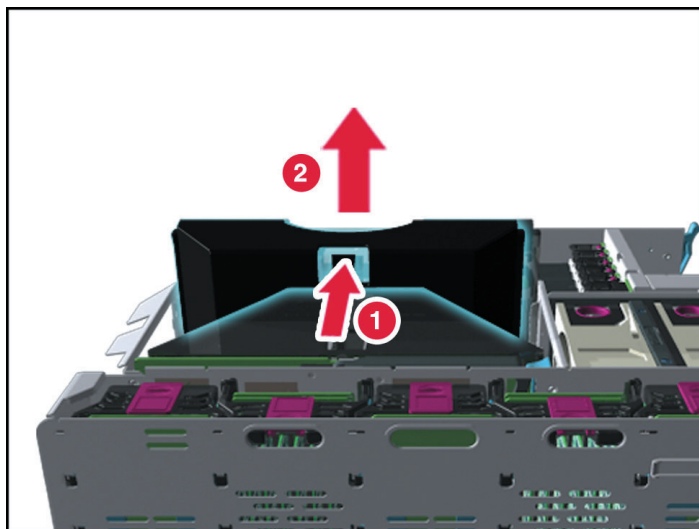
To remove the processor boards and processors:

1. Power down the server. Refer to "Powering Down the Server" in Chapter 2.

> ⚠ **WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.**

2. Remove the host module. Refer to "Removing the Host Module" in this chapter.

3. If a processor board air baffle is installed (in the case of a single processor board configuration), remove it before removing the processor board. Remove the processor board air baffle by pressing in the release tab (1) while pulling the air baffle up (2).

Figure 4-5: Removing the processor board air baffle

4. Push the lever latch forward to release the processor board lever (1).

5. Lift the processor board lever up (2) and lift the processor board out of the module (3).
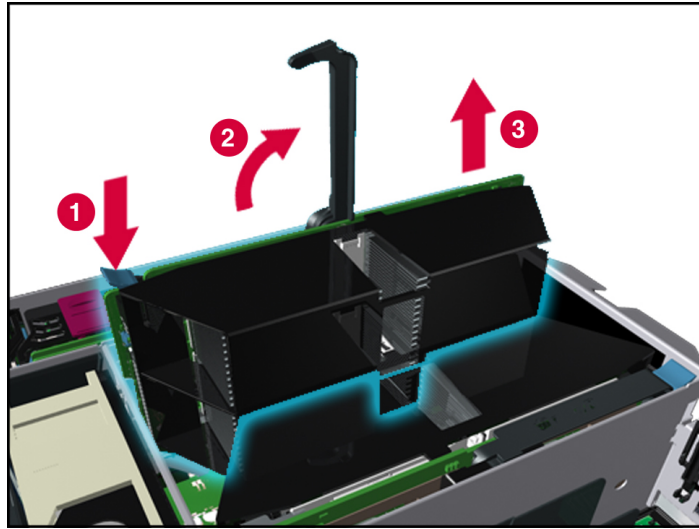
Figure 4-6: Removing the processor board

6. Push in the four tabs on the side of the processor board cover (1) and then lift the cover off the processor board (2).
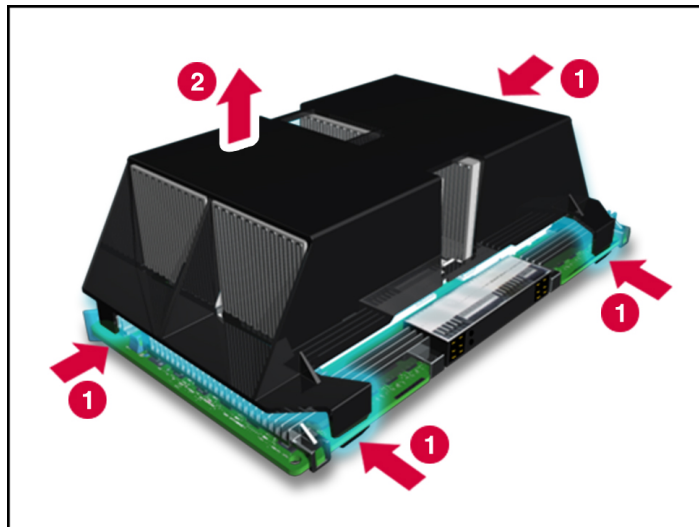
Figure 4-7: Removing the processor board cover

7. Turn over the processor board to access the processor clips.

8. Lift the processor clip to unlock it (1) and then slide it (2) to remove it from the processor board.
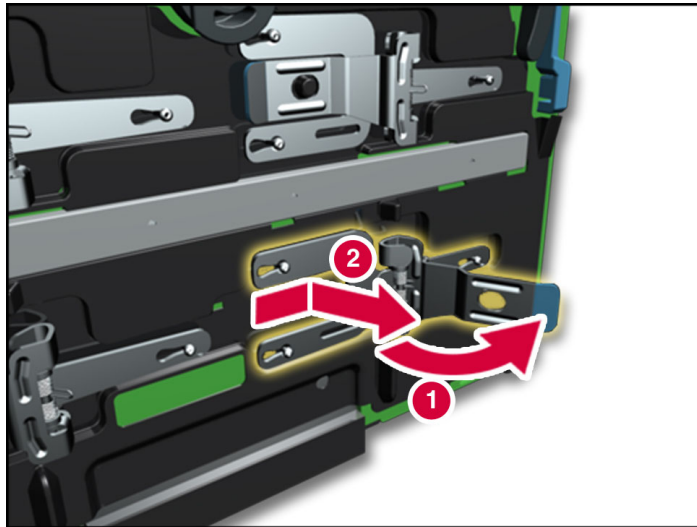
Figure 4-8: Removing the processor clip

9. Turn the processor board over to access the processors.

10. Open the processor release lever (1) and remove the processor (2).
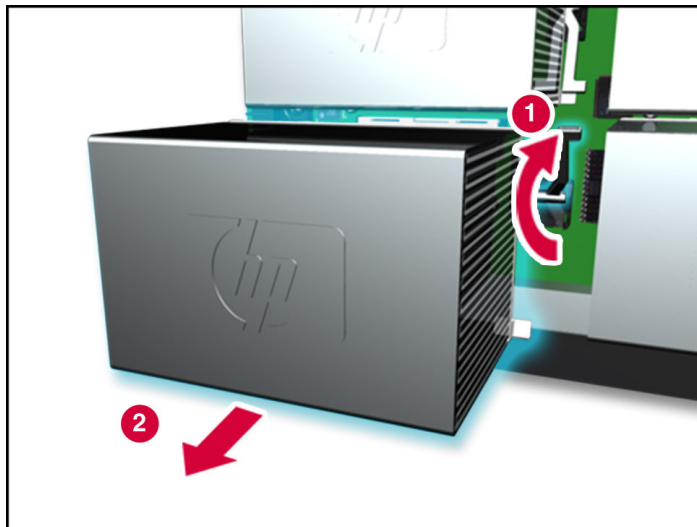
Figure 4-9: Removing the processor

Reverse steps 1 through 10 to install a processor and the processor board.

NOTE: Processor board 2 does not need to be installed for the server to run.

Memory Cartridge

Identifying

The five Hot Plug RAID Memory cartridges are located in the front side of the host module. Each memory cartridge contains up to eight DIMMs.

Figure 4-10: Memory cartridge area

Memory Cartridge Components

The following figure and table show the various components of the memory cartridges.

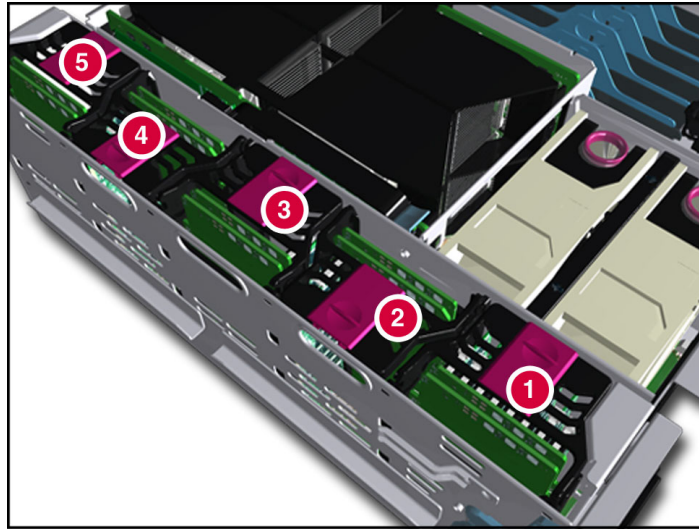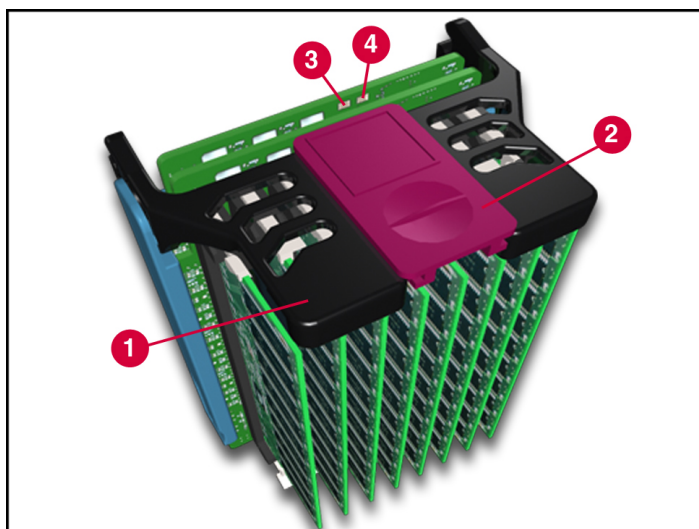**Figure 4-11: Memory cartridge components**

Item	Description
1	Cartridge lever
2	Cartridge lock
3	Cartridge attention LED
4	Cartridge power LED

Removing the Memory Cartridge

To remove a memory cartridge from the ProLiant DL740 server:

1. Unlock the memory cartridge by sliding the cartridge lock open (1).

IMPORTANT: If the memory cartridge is not required for continued operation (with at least four other memory cartridges installed, online, and error free), the memory cartridge power LED will turn off.

IMPORTANT: If the cartridge is required for continued operation, an audible caution alarm will sound and the memory cartridge attention LED indicator will blink until the cartridge is locked again.

2. Be sure that the cartridge power LED is off.

> **CAUTION:** Do **not** remove a memory cartridge if the cartridge power LED is blinking or is solid green. The system will halt.
>
> If the cartridge power LED has not turned off after unlocking the cartridge, then one of the following conditions exists:
>
> *   Another cartridge is either powered down or removed.
>
> *   Another cartridge in the system has errors.

3. Lift the cartridge lever upward to release the memory cartridge (2).

4. Pull the cartridge out of the host module (3).

> **CAUTION:** Do not leave a memory cartridge out of its slot for more than two minutes to ensure proper airflow and cooling.
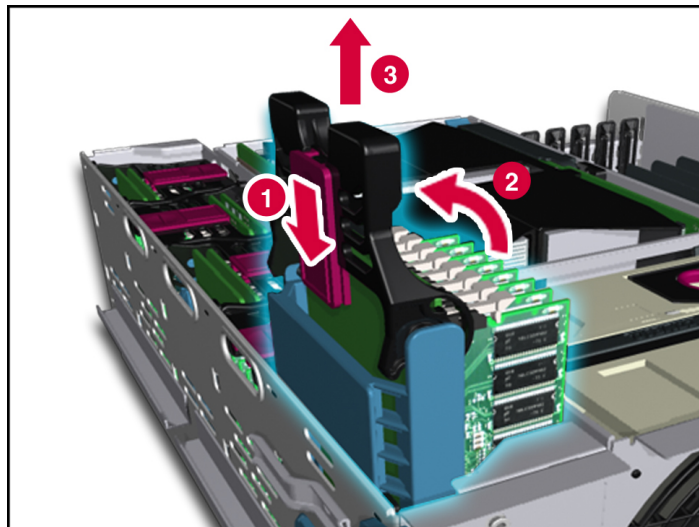
Figure 4-12: Removing the memory cartridge

> **CAUTION:** Inspect the memory cartridge for bent pins before reinstalling it. Do not "drop" the cartridge into the cage.

DIMM Overview

The ProLiant DL740 server has five memory cartridges, each consisting of eight DIMMs. The server supports up to 32 GB of usable memory with 8 GB of redundant memory.

Locating the DIMM Sockets

Figure 4-13 and Table 4-1 detail the DIMM socket locations on the memory cartridge.
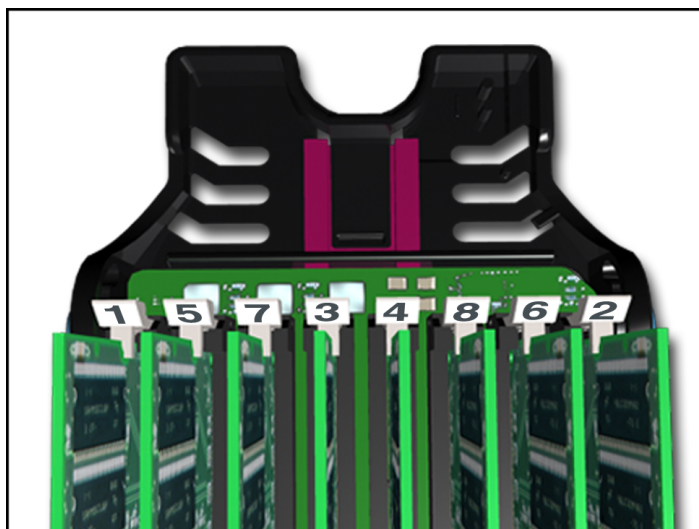
Figure 4-13: DIMM socket location

Table 4-1: DIMM Socket Location

Item	Description	Bank	
1	DIMM socket 1	DIMM bank 1	Bank pair for interleaving
2	DIMM socket 2	DIMM bank 2	
3	DIMM socket 3	DIMM bank 3	Bank pair for interleaving
4	DIMM socket 4	DIMM bank 4	
5	DIMM socket 5	DIMM bank 5	Bank pair for interleaving
6	DIMM socket 6	DIMM bank 6	
7	DIMM socket 7	DIMM bank 7	Bank pair for interleaving
8	DIMM socket 8	DIMM bank 8	

Installing DIMMs in the Cartridge

⚠️ **CAUTION:** When handling a DIMM, be careful not to touch any of the contacts. Doing so might damage the DIMM.

IMPORTANT: Be sure that DIMMs are installed in the proper orientation. The DIMMs are keyed to ensure that they are installed correctly in the memory socket. Refer to the system documentation for details.

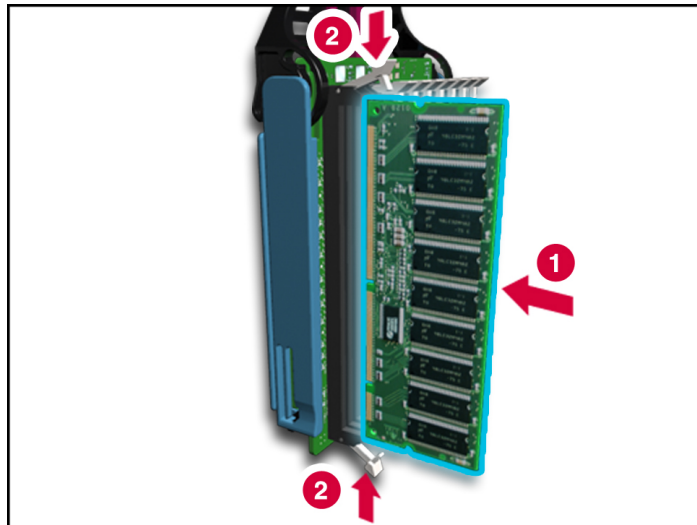**IMPORTANT:** Be sure that the DIMMs are installed in bank pairs and in proper bank pair order (1+2, then 3+4, then 5+6, then 7+8).

To install DIMMs in the memory cartridge:

1. Slide each DIMM into the appropriate socket on the memory board (1).

2. Secure the DIMM by lifting the locking levers into place (2).

Figure 4-14: Installing DIMMs in the memory cartridge

3. Be sure that all of the DIMM socket levers are rotated inward.

4. Insert the memory cartridge into the server and secure it in place by rotating the cartridge lever down.

5. Lock the memory cartridge in place by sliding the cartridge lock to the locked position.

6. Be sure that the cartridge is online.

Hot-Replacing Memory

If there is a problem with a DIMM in the server, the DIMM status LEDs will illuminate as either solid or blinking. If the DIMM status LED for a specific DIMM in a specific cartridge is solid, then the DIMM needs to be replaced.

> ⚠ **CAUTION:** A redundant memory configuration is required when performing Hot Plug RAID Memory functions.
>
> - If all memory cartridges are online and error free, any memory cartridge can be removed.
>
> - If one of the five memory cartridges requires attention, only that memory cartridge can be removed.
>
> - If two or more memory cartridges require attention and are online (cartridge power LED is illuminated), then no cartridge can be removed. An audible alarm will sound if any cartridge is unlocked.

IMPORTANT: You cannot perform a hot-replace of memory if only four memory cartridges are installed. The system must have a redundant memory configuration before the hot-replace feature will function.

To replace DIMMs:

1. Unlock the cartridge and slide it out of the server by following the procedure in the "Memory Cartridge" section of this chapter.

> ⚠ **CAUTION:** Do **not** remove a memory cartridge if the cartridge power LED is blinking or is solid green. The system will halt.

2. Remove the failed DIMM.

3. Install a working DIMM of the same speed, type, and size. It should have the same HP part number (for example 123456-12x, where x is not required to match).

> ⚠ **CAUTION:** When handling a memory module, be careful not to touch any of the contacts. Doing so can damage the module.

IMPORTANT: Be sure DIMMs are installed in proper orientation. The DIMMs are keyed to be sure they are installed correctly in the memory socket.

4. Rotate all of the DIMM socket levers inward.

5. Insert the memory cartridge in the server and secure it in place by closing the cartridge lever.

6. Lock the memory cartridge in place by sliding the cartridge lock to the locked position.

7. The system will rebuild and verify the data on the DIMMs in the memory cartridge while the cartridge power LEDs are blinking. This process is complete when the cartridge power LED is illuminated solid green, indicating that the cartridge is online.

8. Continue with normal server operation.

PCI-X Hot Plug and Non-Hot-Plug I/O Expansion Boards

The ProLiant DL740 server supports PCI-X Hot Plug. PCI-X Hot Plug and the operating system of the server work together to allow the following hot-plug actions:

- **Hot-replace**—Allows you to replace a failed expansion board with an identical expansion board without powering down the server.

- **Hot-add**—Under some operating systems, allows you to install new PCI-X expansion boards in previously empty slots without powering down the server.

- **Hot-upgrade**—Allows you to replace an expansion board with a different expansion board without powering down the server.

PCI-X Hot Plug features enable you to replace, add, and upgrade PCI or PCI-X expansion boards without powering down the server by either using the PCI Hot Plug button or the PCI Hot Plug Utility software. Any PCI adapter can be placed in a PCI Hot Plug slot. However, PCI Hot Plug device drivers and operating system support are required to enable the PCI Hot Plug feature.

PCI-X Hot Plug is backward compatible, although system components fit into one of two categories: hot-plug aware or non-hot-plug aware. The server **must** have all of the following to be PCI-X Hot Plug-capable:

- PCI-X Hot Plug system hardware (available in this server)

- PCI-X Hot Plug device drivers (installed from the SmartStart CD)

- An operating system that supports PCI-X Hot Plug technology (support levels vary)

For information about specific operating systems with PCI-X Hot Plug support, refer to the operating system support matrix available at

ftp://ftp.compaq.com/pub/products/servers/os%20feature%20matrix%
20103000.pdf

> ⚠ **WARNING: To reduce the risk of personal injury from hazardous energy or damage to the equipment when working on energized servers:**
>
> - **Remove all watches, rings, and any other loose-fitting jewelry.**
>
> - **Avoid the use of conductive tools that could bridge live parts.**

IMPORTANT: If any of the three required components are not hot-plug aware, the system is fully functional but is not PCI-X Hot Plug-capable.

PCI Hot Plug Utility

SmartStart software provides the PCI Hot Plug Utility for each operating system supported by the server. The PCI Hot Plug Utility is delivered as part of the HP Support Pack, which is available on the SmartStart CD and at the website:

www.hp.com/servers/proliant/manage

The PCI Hot Plug Utility is the user interface of the PCI Hot Plug architecture. The application performs the following functions:

- Slot control

- PCI Hot Plug option configuration

- Expansion board status monitoring and reporting

For more information, refer to the SmartStart documentation.

Locating the I/O Expansion Slots

The I/O expansion slots are located in the host module and are accessed by sliding the server out of the rack and opening the top access panels, as described in Chapter 3. The I/O expansion slots are distributed among three separate PCI-X buses.

⚠ **WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.**
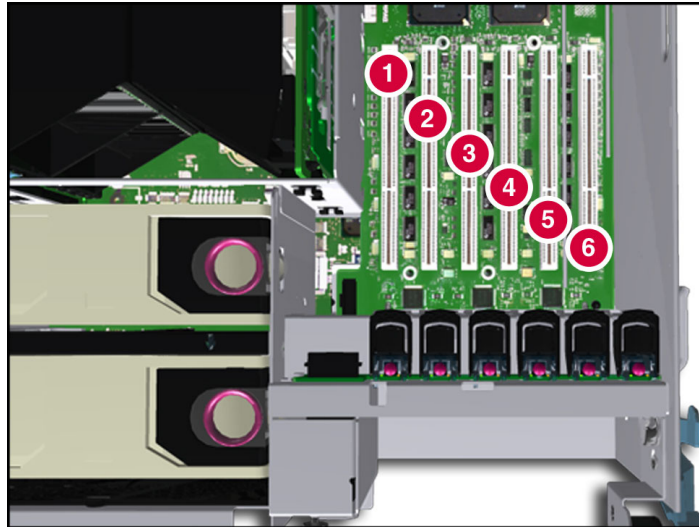

Figure 4-15: Top view of I/O slots

Table 4-2: I/O Expansion Slots

Slot	Description
Slots 1 and 2	PCI bus 7—Supports 64-bit PCI-X ex pansion boards at 100 MHz; it is keyed for 3.3 V signaling.
Slots 3 and 4	PCI bus 11—Supports 64-bit PCI-X ex pansion boards at 100 MHz; it is keyed for 3.3 V signaling.
Slots 5 and 6	PCI bus 3—Supports 64-bit PCI-X ex pansion boards at 100 MHz; it is keyed for 3.3 V signaling.

NOTE: Each PCI-X bus automatically configures to run in the most advanced mode (PCI-X or PCI) and the highest frequency supported by all expansion boards installed in the slots on the bus.

PCI Hot Plug Button

The PCI Hot Plug button provides PCI Hot Plug hardware control without requiring you to first run the PCI Hot Plug Utility software. Press the port-colored PCI Hot Plug button once to power down or power up a slot. You can cancel an action by pressing the button again within five seconds. When you press the button, the system automatically stops or starts expansion board drivers. Refer to Figure 4-16, Figure 4-17, and Table 4-3 to locate the PCI Hot Plug button.

PCI Hot Plug LED Indicators

The PCI Hot Plug amber and green LEDs (shown in the following figure for one slot) provide a visual reference for the status of each slot. The LEDs can be viewed from the rear of the server, as shown in Figure 4-16, or inside the host module, as shown in Figure 4-17.
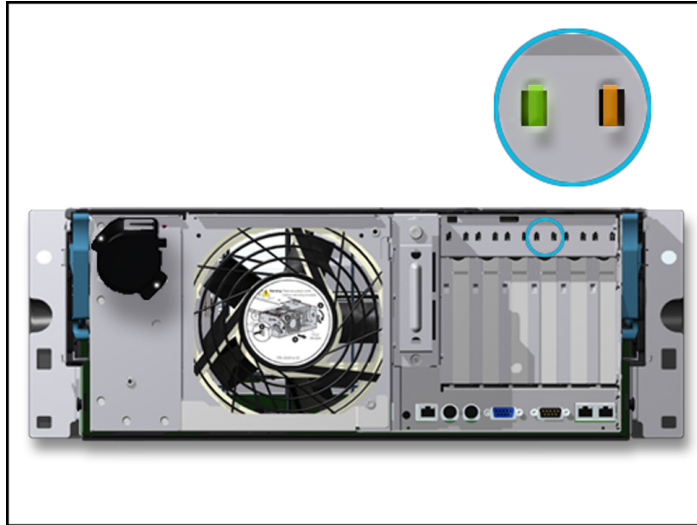

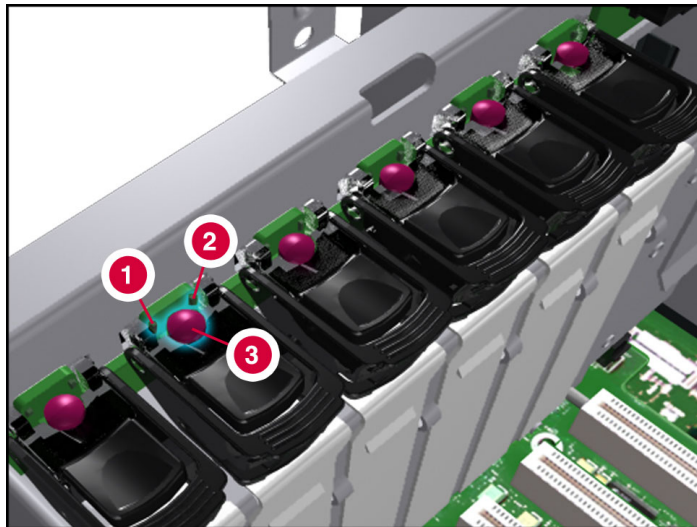**Figure 4-16: PCI Hot Plug LEDs from the rear of the server**

Figure 4-17: PCI Hot Plug LEDs inside the host module

Table 4-3 provides a description and slot status for the PCI Hot Plug LEDs and button, shown in Figure 4-17.

Table 4-3: PCI Hot Plug LEDs and Button

	Amber LED	**OK to Open**	**Slot Condition and Status**
1	Off		Slot does not require attention.
	On		Slot requires attention. There could be a problem with the slot, the PCI board, or the driver. Check the green LED before opening the slot.
			Refer to the IML or the PCI Hot Plug software application for a description of the problem indicated.
	Green LED	**OK to Open**	**Slot Condition and Status**
2	On	No	Power is applied to the slot.
	Blinking	No	Power to the slot is being turned off or on. This process could take several minutes. Do **not** open the slot release lever until the green LED is completely off.
	Off	Yes	You can replace or remove the board in this slot only.
3	**PCI Hot Plug Button**	Each PCI Hot Plug button is used to activate or deactivate its associated PCI Hot Plug slot. Activating or deactivating a PCI Hot Plug slot can also be accomplished through the operating system PCI Hot Plug software application.	

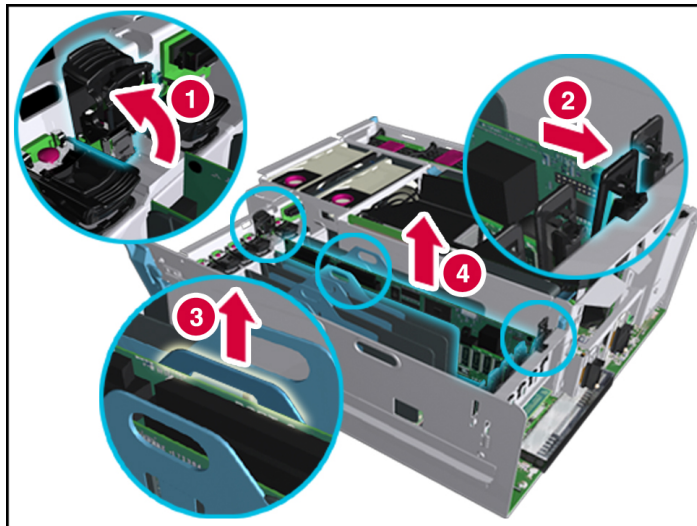## Removing or Replacing a Non-Hot-Plug Expansion Board

⚠ **CAUTION:** Do not open the slot release lever unless the green PCI Hot Plug LED indicator is off. System power down and subsequent data loss could occur.

To remove a non-hot-plug expansion board:

1. Power down the server. Refer to "Powering Down the Server" in Chapter 2.

2. Slide the server out of the rack.

3. Open the top access panel. Refer to "Top Access Panels" in Chapter 3.

4. Remove any expansion board I/O cables as appropriate.

5. Press on the top of the appropriate expansion slot release lever (1) and open the slot-keeper lever toward the front of the expansion slot (2).

6. Unseat the expansion board by pulling up on the plastic tab (3), and then lift the board out of the server (4).

IMPORTANT: If you are only removing the expansion board, install an expansion slot cover in the slot.

Figure 4-18: Removing a non-hot-plug expansion board

To replace a non-hot-plug expansion board:

1. Insert the PCI/PCI-X expansion board into the appropriate expansion slot (1), pushing firmly until the board is securely seated.

2. Close the expansion slot release lever from the rear of the unit to secure the board (2). Be sure that the lever latches into the closed position.
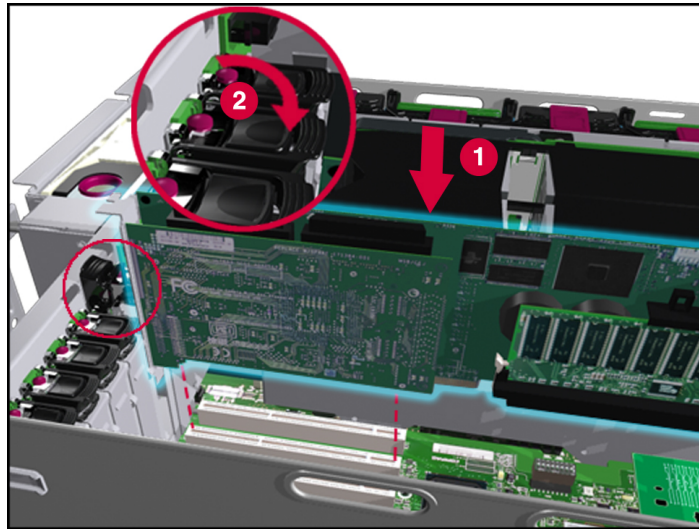

Figure 4-19: Inserting the PCI/PCI-X expansion board

3. Connect the expansion board I/O cable as appropriate.

   HP has designed a self-latching slot keeper feature to accommodate full-length expansion boards.

   Be sure that the V-shaped slot keeper tabs on the plastic expansion board guide are positioned over the forward end of the expansion board. Using the slot keepers is especially important when expansion boards are added or when the server is moved.
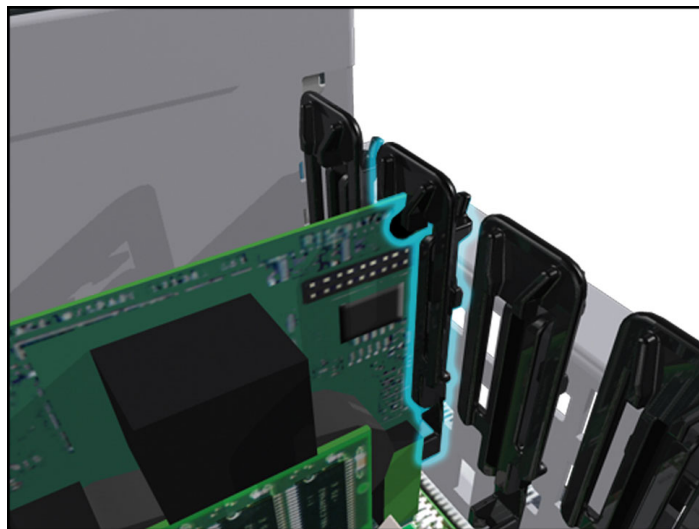
Figure 4-20: Full-length self-latching slot keeper feature

4. Close the top access panel and slide the server into the rack.

5. Power up the server. Refer to "Powering Up the Server" in Chapter 2.

6. If necessary, run the ROM-Based Setup Utility, as described in the *HP ProLiant DL740 Server User Guide.*

NOTE: Refer to the HP QuickSpecs for the ProLiant servers at www.hp.com for a list of supported I/O expansion boards.

Removing or Replacing a PCI Hot Plug Expansion Board

To remove or replace a PCI Hot Plug expansion board:

1. Open the top access door of the server.

2. Use the PCI Hot Plug button or software application to notify the system to turn off power to the slot. Pushing the PCI Hot Plug button notifies the system to shut down operation of the expansion board; lifting the lever actually powers down the expansion slot. The green LED flashes during the power-down transition and turns off when the power-down process is complete. For more information about PCI Hot Plug LEDs, see "PCI Hot Plug LED Indicators" earlier in this chapter.

⚠ **CAUTION:** To avoid system power-down and subsequent data loss, do **not** open the slot release lever unless the green PCI Hot Plug LED of the slot is off.

3. Disconnect the cables to the PCI/PCI-X board when the green LED of the slot is off.

4. Press on the top of the appropriate expansion slot release lever (1) and open the lever toward the rear of the expansion slot (2).

5. Unseat the expansion board by pulling up on the plastic tab (3), and then lift the board out of the server (4).
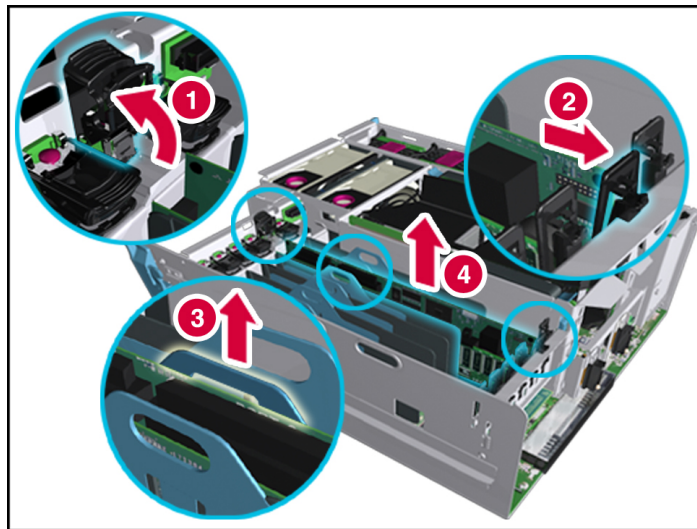
Figure 4-21: Removing an I/O expansion board

6. If you are only removing the board and not replacing it, install an expansion slot cover.

   a. Close the slot release lever.

   b. Be sure that the lever latches into the closed position.

7. If you are replacing the board, install the new I/O expansion board.

    a. Close the slot release lever.

    b. Be sure that the lever latches into the closed position.

    c. Reconnect any I/O cables to the new board.

    d. Return power to the slot through the PCI Hot Plug button or software application. The green LED will flash during the power-up transition and will turn on when the power-up is complete. For more information about PCI Hot Plug LEDs, refer to "PCI Hot Plug LED Indicators" earlier in this chapter.

8. Close the top access panels.

Array Enabler Board/Integrated Array Bypass Kit

The SmartArray 5i Controller is routed to the internal drives through the Array Enabler Board in the host module. The Integrated Array Bypass kit allows you to replace the Array Enabler board with a connector and cable that you can connect to an optional controller board. For information on the Integrated Array Bypass kit, refer to the installation instruction included with the kit.

> ⚠ **WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.**

> ⚠ **CAUTION:** Back up the data each time you move drive arrays or change the configuration.

Removing the Array Enabler Board

To remove the Array Enabler board from the host module:

1. Shut down the operating system in an orderly manner as directed in the operating system instructions.

2. Power down the server. Refer to "Powering Down the Server" in Chapter 2.

3. Disconnect the cables.

4. Slide the server out of the rack.

5. Slide the host module out of the chassis approximately 8 cm (3 in). Refer to "Removing the Host Module" in this chapter.

6. Open the top access panels. Refer to "Top Access Panels" in Chapter 3.

7. Slide the retaining clip (1) and remove the Array Enabler board from the server (2), as shown Figure 4-22.
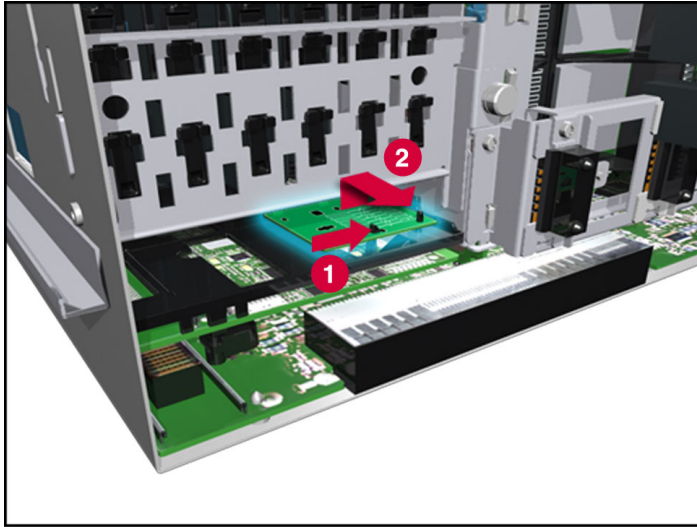
**Figure 4-22: Removing the Array Enabler board**

NOTE: If an Array Bypass assembly is installed, disconnect the cable from the optional array controller, then remove the bypass assembly by sliding the retaining clip and remove the Array Bypass board from the server.

I/O Expansion Slot Dividers

To remove the five I/O expansion slot dividers:

1. Power down the server. Refer to "Powering Down the Server" in Chapter 2.

2. Open the top access panel. Refer to "Top Access Panel" in Chapter 3.

3. Remove all installed expansion boards in slots 1 through 6. Refer to "Removing or Replacing a Non-Hot-Plug Expansion Board" in this chapter.

4. Remove each I/O expansion board divider by depressing the divider clip to release the divider (1), and then sliding the divider away from the PCI Hot Plug buttons and lifting it out (2).
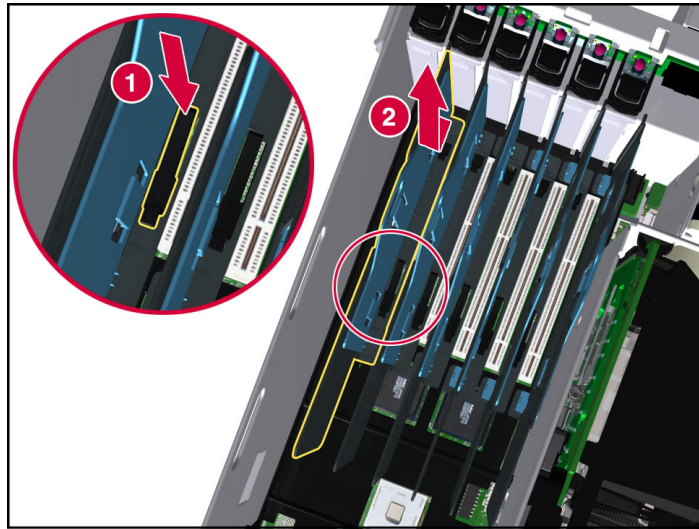

Figure 4-23: Removing the I/O expansion slot dividers

Reverse steps 1 through 4 to replace the I/O expansion slot dividers.

Hot-Plug Fans

The ProLiant DL740 server ships with two hot-plug fans. Fan 1 is closest to the front of the server. Each fan has an arrow-shaped status LED that indicates the status of the fan to which the arrow is pointing. Figure 4-24 shows an example of the hot-plug fan status LEDs:

- Hot-plug fan 1 LED (1)—In this case, the LED is amber, which means that the fan needs attention or is not installed.

- Hot-plug fan 2 LED (2)—In this case, the LED is green, which means that the fan is installed and working properly.
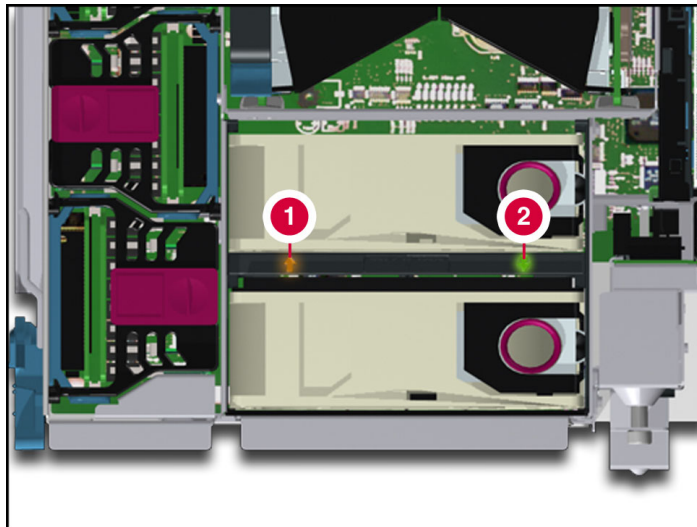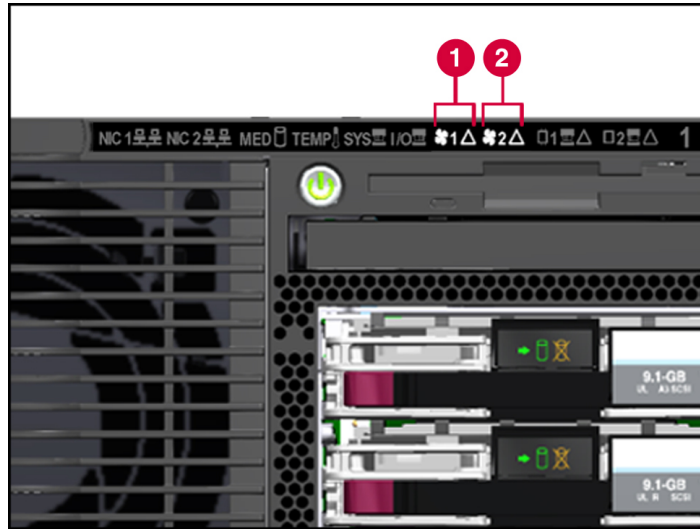

Figure 4-24: Hot-plug fan LEDs

⚠ **CAUTION:** Never remove **both** hot-plug fans while the server is powered up. Overheating and damage to hardware could result. If the appropriate HP software drivers are installed, the operating system software will initiate a power shutdown.

The ProLiant DL740 server comes equipped with fan attention LEDs located on the front of the server, shown in Figure 4-25.
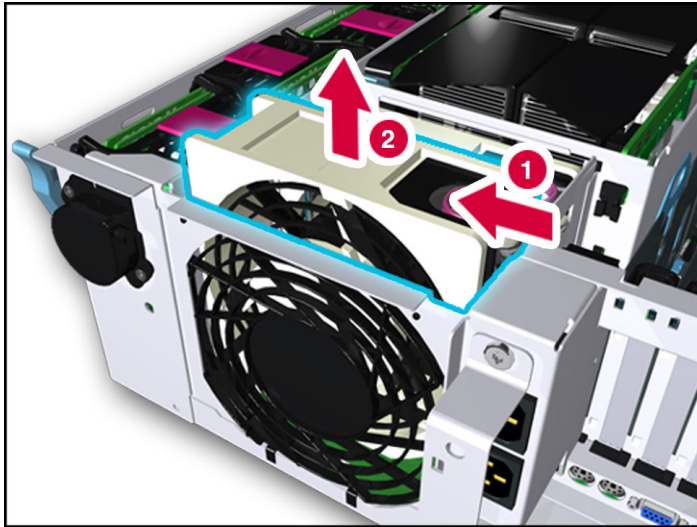

Figure 4-25: Fan attention LEDs

Item	Description
1	Hot-plug fan 1 attention LED
2	Hot-plug fan 2 attention LED

Replacing a Hot-Plug Fan

To replace a hot-plug fan:

1. Open the top access panels.

2. Squeeze the locking latch with your fingers (1) and lift the failed hot-plug fan out of the host module (2).


Figure 4-26: Removing hot-plug fan 2

3. Lower the new hot-plug fan into the host module until it rests on the system board connector. Push the fan into the connector. The fan locking latch will lock into place.

4. Be sure that the LED is green and close the top access panels.

Input/Output Board

The ProLiant DL740 server ships with a removable input/output board.

To remove the I/O board:

1. Power down the server. Refer to "Powering Down the Server" in Chapter 2.

2. Remove the host module. Refer to "Removing the Host Module" in this chapter.

3. Remove the I/O expansion boards. Refer to "Removing I/O Expansion Boards" in this chapter.

4. Remove each I/O expansion board divider by depressing the divider clip to release the divider (1), and then sliding the divider away from the PCI Hot Plug buttons and lifting it out (2).
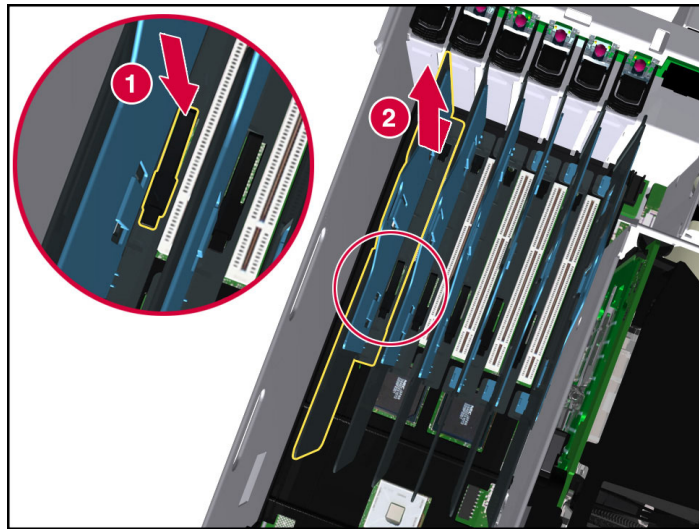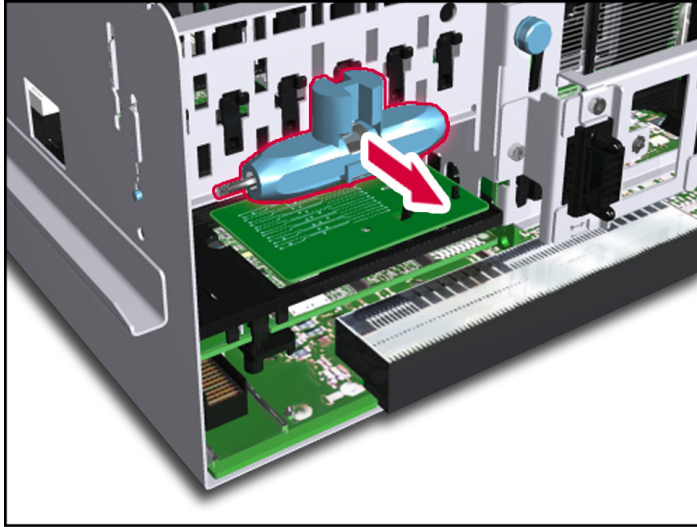

Figure 4-27: Removing the I/O expansion board dividers

5. Remove the array enabler board. Refer to "Removing the Array Enabler Board" in this chapter.
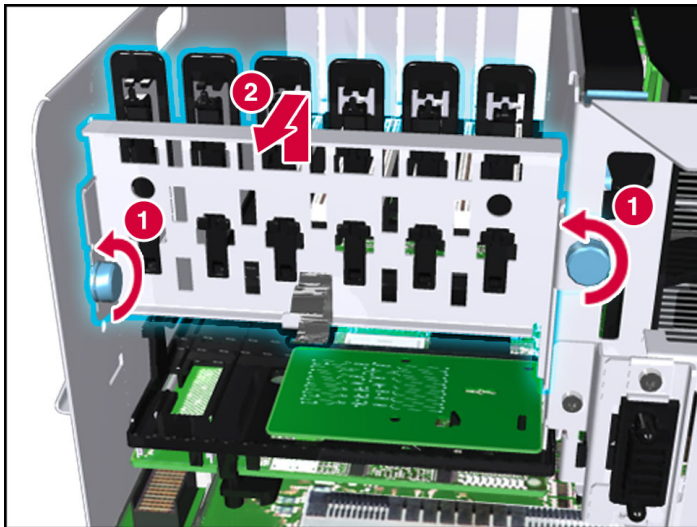
6. Locate and remove the Torx tool.

NOTE: If you have installed the integrated array bypass assembly, see "Removing the Integrated Array Bypass Assembly" in this chapter.


Figure 4-28: Removing the Torx tool

7. Disconnect the I/O expansion board bracket by releasing the thumbscrews (1), and then lifting the bracket and sliding it towards you (2).

Figure 4-29: Disconnecting the I/O expansion board bracket

8. Disconnect the PCI-X Hot Plug switchboard cable from the PCI-X Hot Plug switchboard.

9. Release the retention clip (1).

10. Insert the beveled wrench between the I/O board and the chassis (2) and turn the tool clockwise to unseat the board.

11. Depress the spring-loaded retainer on the right side of the bay (4) and lift the board out of the chassis (5).
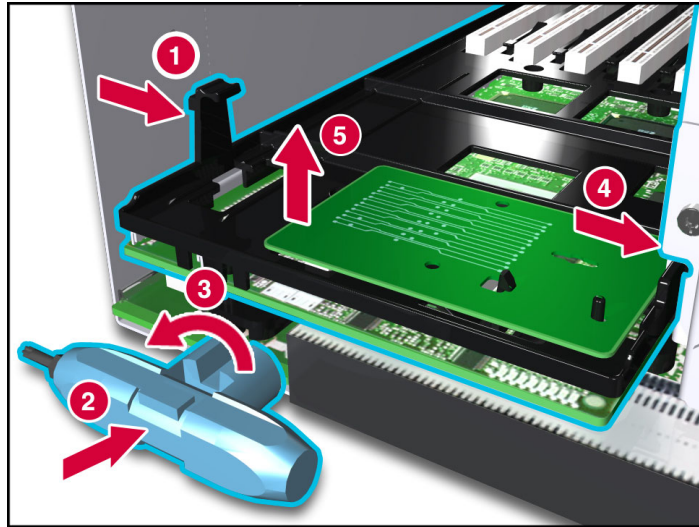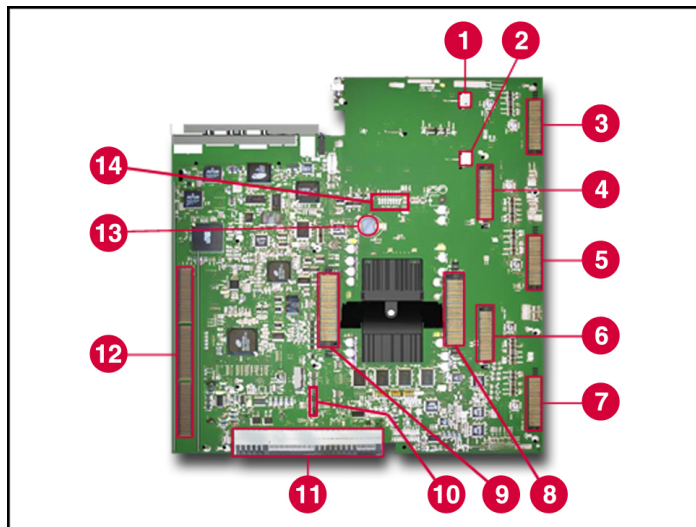

Figure 4-30: Removing the I/O board

System Board

The system board is located in the bottom of the host module.

Figure 4-31: System board components

Item	Description
1	Fan 2 connector
2	Fan 1 connector
3	Memory cartridge 1 connector
4	Memory cartridge 2 connector
5	Memory cartridge 3 connector
6	Memory cartridge 4 connector
7	Memory cartridge 5 connector
8	Processor board 2 connector
9	Processor board 1 connector
10	Remote Insight board connector
11	System/midplane board connector
12	I/O board connector
13	System battery
14	iLO diagnostic LEDs

5

Power and Media Module Removal and Replacement Procedures

The power supplies and mass storage in the HP ProLiant DL740 server are located in the power and media module. The power and media module can configure a maximum of four 1-inch hot-plug U320 Universal SCSI hard drives or Wide Ultra3 SCSI hard drives.

The power and media module supports two non-hot-plug media drive bays:

- One drive bay occupied by a 1.44-MB diskette drive

- One drive bay occupied by a DVD/CD-ROM drive

> △ **CAUTION:** Removable media blank bezels and hot-plug drive cage blanking panels must be installed over unused mass storage and removable media device bays to maintain proper airflow.

This chapter explains the removal and replacement procedures for the power and media module and its components and provides cabling guidelines.

Removing the Power and Media Module

⚠ **WARNING:** **The power and media module weighs more than 15.88 kg (35 lbs). HP recommends removing both power supplies before handling the module, or having two people handle the module together.**

⚠ **WARNING:** **The host module must be removed before attempting to remove the power and media module.**

⚠ **CAUTION:** Do not attempt to remove the power and media module while power is applied to the system. The module is not hot-pluggable. Immediate system shutdown and data loss will occur.

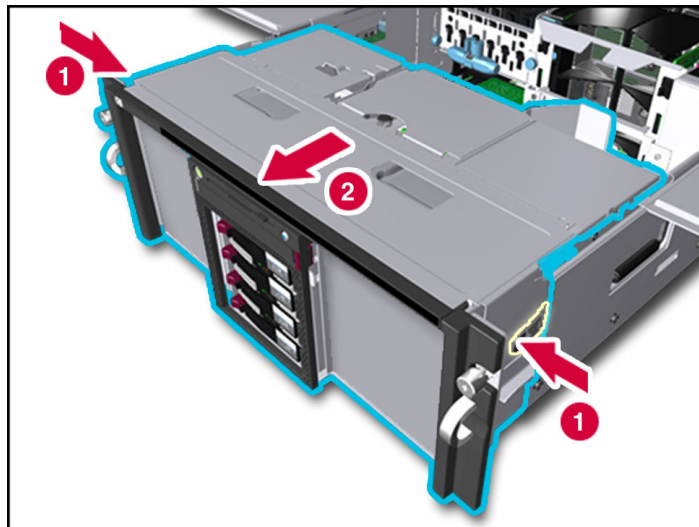To remove the power and media module, perform the following steps:

1. Power down the server. Refer to "Powering Down the Server" in Chapter 2.

2. Slide the server out of the rack.

3. Open the top access panels. Refer to "Top Access Panels" in Chapter 2.

4. Remove both power supplies from the front of the module. Refer to "Removing and Replacing Hot-Plug Power Supplies" in this chapter.

5. Release the host module from the chassis. Refer to "Removing the Host Module" in Chapter 4.

6. Push in the levers on the power and media module (1), as shown in Figure 5-1.

7. Pull the power and media module out of the chassis (2) until it encounters the module stop latches.
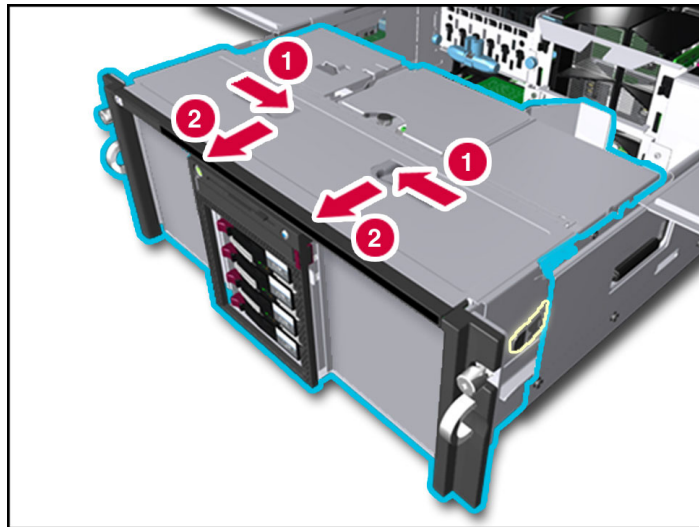
Figure 5-1: Opening the power and media module

8. Press in on the module stop latches (1) and pull the module out of the chassis (2), as shown in Figure 5-2.

Figure 5-2: Removing the power and media module

> ⚠ **WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.**

9. To reassemble the server, slide the module in until the levers begin to rotate. Then push the levers shut until they snap into place.

IMPORTANT: Check the System Interconnect status LEDs to ensure that the module is properly seated. Refer to "System Interconnect LED Indicators" in Chapter 7.

Hot-Plug Power Supplies

The ProLiant DL740 server ships with two hot-plug power supplies. The system power in the ProLiant DL740 server does not have to be shut off to replace one of the power supplies.

> ⚠ **WARNING: To reduce the risk of electric shock or damage to the equipment, disconnect power from the server by unplugging all power cords from either the electrical outlet or the server.**

Estimating Power Requirements for a Specific Server Configuration

To estimate the power requirements for a specific server configuration, use the ProLiant DL740 Power Calculator located on the ActiveAnswers Online Solutions website:

activeanswers.compaq.com

1. Select **System Configurator** under **Tools.**

2. Click **Select Product Family** and select **ProLiant Servers.**

3. From the list, select **ProLiant DL740 Server.**

The subsequent Web pages contain information and a link to the ProLiant DL740 Power Calculator.

Removing and Replacing a Hot-Plug Power Supply

To remove and replace a hot-plug power supply with the system power on:

1. Press the power supply latch to release the power supply handle (1).

2. Rotate the power supply handle outward (2) and slide the power supply out of the chassis (3), as shown in Figure 5-3. Use both hands when removing the power supply to support its weight. Power supplies weigh 4.09 kg (9 lbs) each.

NOTE: When you remove the power supply, a spring-loaded trap door closes to block the opening. This door preserves the air path required to cool the internal components of the server.


Figure 5-3: Removing a power supply

3. Remove the protective covers from the connector on the new power supply. For more information, refer to the installation documentation that came with the power supply. Keep the protective covers for future handling.

4. Slide the hot-plug power supply into the power supply cage until the supply is seated securely (1), as shown in Figure 5-4. This action automatically pushes the spring-loaded trap door open.

5. Rotate the handle inward to lock the power supply into place (2, 3). The power supply fan starts immediately if the system is running.

**IMPORTANT:** The power supply fan will start and run at low speed if the system is in Standby mode.
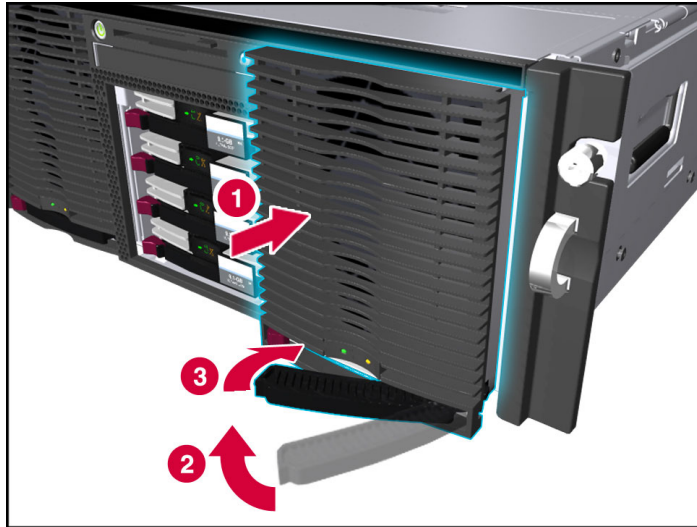
Figure 5-4: Securing the hot-plug power supply

6. Be sure that the AC status LED is green.

If the installation is performed with the system power on, the AC power LED will illuminate solid. If the installation is performed with the system power off, the AC power LED will blink to indicate that the power supply is in Standby mode.

Power Supply LED Indicators

Each power supply has status and AC power LEDs. Refer to Figure 5-5 and Table 5-1 for a detailed description of both indicators.
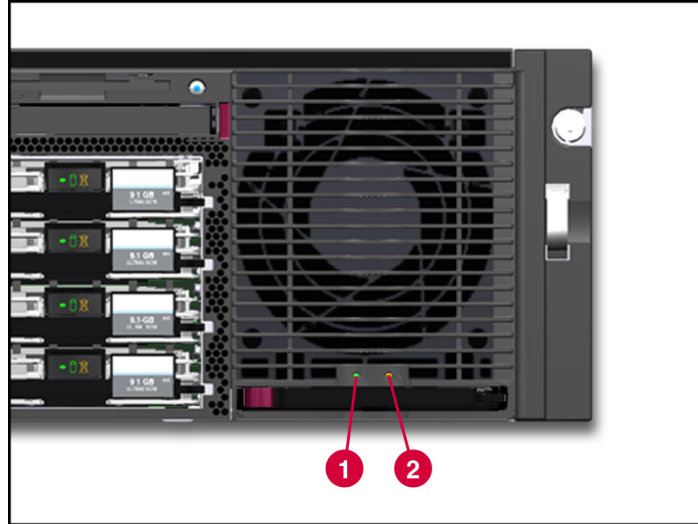

Figure 5-5: Power supply LEDs

Table 5-1: Power Supply LEDs

Item	Condition	Meaning
1 AC Power	Green blinking	AC power is connected to this power supply. System is in standby mode.
	Green	Normal operation.
	Off	No AC power.
2 Attention	Amber	Fault detected in this power supply. Replace power supply. -or- No A/C power.
	Amber blinking	Power supply is in current limit mode.
	Off	Normal operation.

Power and Media Module Bezel

To remove the power and media module bezel:

1. Power down the server. Refer to "Powering Down the Server" in Chapter 2.

2. Remove both power supplies. Refer to "Removing and Replacing a Hot-Plug Power Supply" in this chapter.

3. Remove the power and media module. Refer to "Removing the Power and Media Module" in this chapter.

4. Remove the power and media module cover by loosening the thumbscrew (1), sliding the cover back, and then lifting the cover off of the module chassis (2).
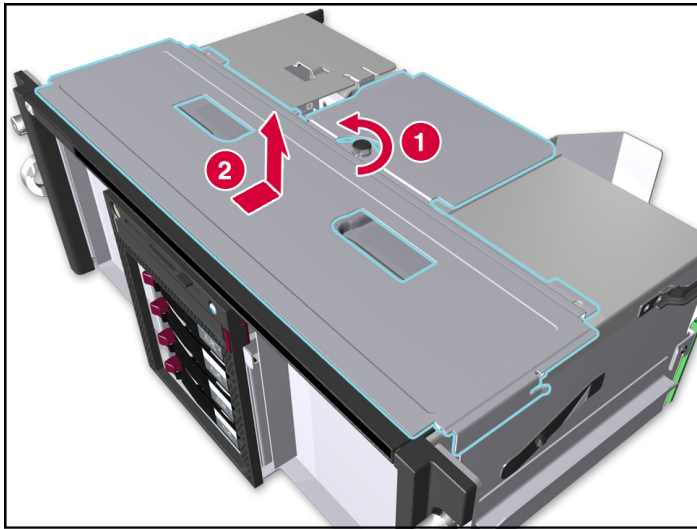
Figure 5-6: Removing the LED bezel

5. Remove the LED bezel by lifting it off the chassis.

6. Press the tabs on both sides of the bezel to release it from the chassis (2).

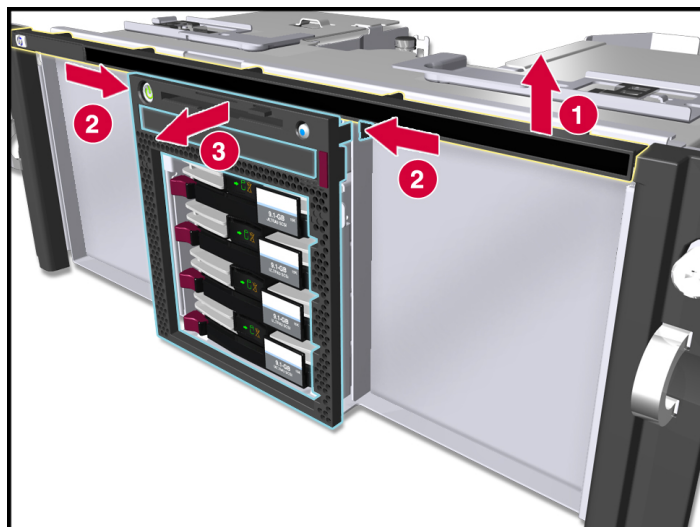7. Pull the power and media module bezel away from the chassis (3).

Figure 5-7: Removing the bezels from the power and media module

Reverse steps 1 through 7 to replace the power and media module bezel.

Hot-Plug Hard Drives

Hot-Plug SCSI Hard Drive Replacement Guidelines

You should be able to hot-plug a drive during normal activity. Be aware, however, that replacing a hot-pluggable disk drive will affect system performance and fault tolerance.

NOTE: Depending on your configuration, both a drive failure and the subsequent rebuild process will cause storage subsystem performance degradation. For example, the replacement of a single drive on an array with 50 logical drives will have less impact than if the array has only three logical drives.

Advanced Data Guarding

When a disk drive is hot-plugged, although the system is functionally operational, the disk subsystem might no longer be fault tolerant. Fault tolerance **will** be lost until the removed drive is subsequently replaced **and** the rebuild operation is completed. This procedure takes several hours, even if the system is not busy while the rebuild is in progress. If another drive in the array should incur an error during the period when fault tolerance is unavailable, a fatal system error could result. If another drive fails during this period, the entire array contents will be lost.

IMPORTANT: Perform disk drive replacement during low activity periods whenever possible. In addition, a current valid backup of the logical drives in the array of the drive being replaced should be available even if the drive replacement is being made during server downtime.

When replacing hot-plug hard drives in a fault-tolerant configuration, follow these guidelines:

- **Never remove more than one drive at a time.** When a drive is replaced, the controller uses data from the other drives in the array to reconstruct data on the replacement drive. If more than one drive is removed, a complete data set is not available to reconstruct data on the replacement drive.

- **Never remove a working drive when another drive has failed.** Drives that have been failed by the controller are indicated by the amber Drive Failure LED on the drive tray. Permanent data loss will occur if a working drive is removed while a failed drive is being replaced.

- **Never remove a drive while another drive is being rebuilt.** An Online LED of a drive will flash green while it is being rebuilt. A replaced drive is restored from data stored on the other drives.

- **Never turn a disk enclosure off while the initiator or controller is powered on or active.** Doing so can cause the initiator or controller to mark the drives as failed. This action can result in permanent data loss.

- **If a drive is replaced while the system is off, it might be necessary to rebuild the replaced drive.** Follow the instructions on the screen or the instructions outlined in the system reference guide.

⚠ **CAUTION:** Pressing the **F2** key will cause permanent data loss to the entire logical drive. Press the **F2** key only if all of the drives have been replaced or if complete data loss is required.

NOTE: When a drive configured for fault tolerance is replaced, the replacement drive automatically begins restoring when it is installed. When a drive is in the process of being restored, the Online LED blinks green. The LED continues to flash until the drive is completely restored.

Hard Drive Blank

To remove a hard drive blank from a hard drive bay:

1. Push the side of the retaining clips inward (1).

2. Pull the hard drive blank from the bay (2).
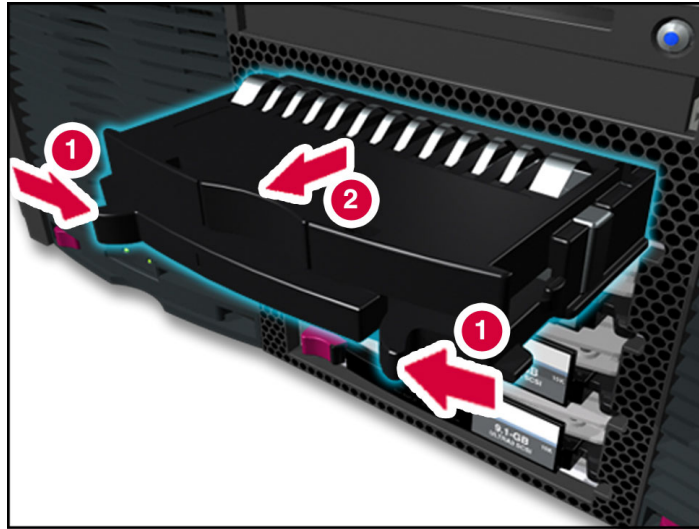
Figure 5-8: Removing a hard drive blank

Reverse steps 1 and 2 to replace a hard drive blank.

Removing a Hot-Plug SCSI Hard Disk Drive

To remove a hot-plug SCSI hard disk drive:

1. To remove a hot-plug SCSI hard drive, push the release button on the left of the drive and rotate the hot-plug drive ejector lever outward to unlock the drive.

2. Pull the drive out of the drive bay.

Figure 5-9: Removing a hot-plug SCSI hard drive

Reverse steps 1 and 2 to replace a hot-plug hard drive.

Removing the DVD/CD-ROM Drive

The half-height universal media bay supports hot-pluggable IDE devices and ships standard with a DVD-ROM drive. The bay also supports other removable media devices, such as a CD-ROM drive.

1. Locate the DVD drive on the front of the server in the universal media bay.

2. The universal media bay ejector button is recessed. Use a tool such as a key, screwdriver, or the provided Torx tool to push the drive ejector button to release the drive (1).

3. Slide the drive out of the module (2).
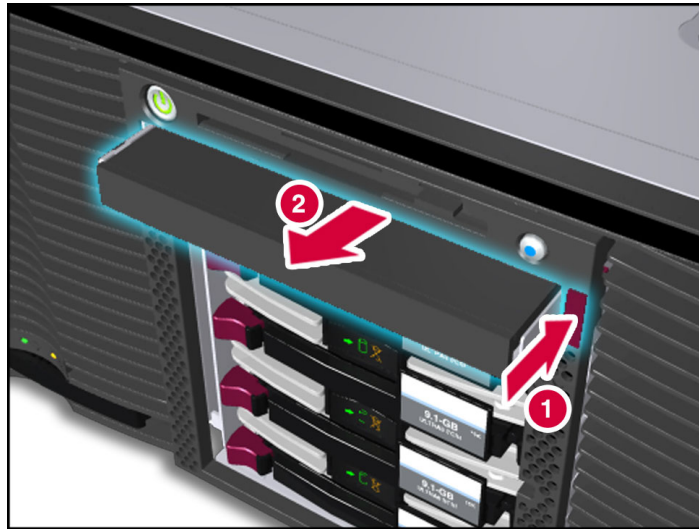
Figure 5-10: Removing a drive from the universal media bay

Removable Media Assembly

The half-height universal media bay supports hot-pluggable IDE devices and ships standard with a DVD-ROM drive. The bay also supports other removable media devices, such as a CD-ROM drive.

NOTE: To replace the 1.44-MB diskette drive, the removable media assembly must be removed.

To remove the removable media assembly:

1. Remove the power and media module. Refer to "Removing the Power and Media Module" in this chapter.

2. Remove the power and media module cover by loosening the thumbscrew (1), sliding the cover back, and then lifting the cover off of the module chassis (2).
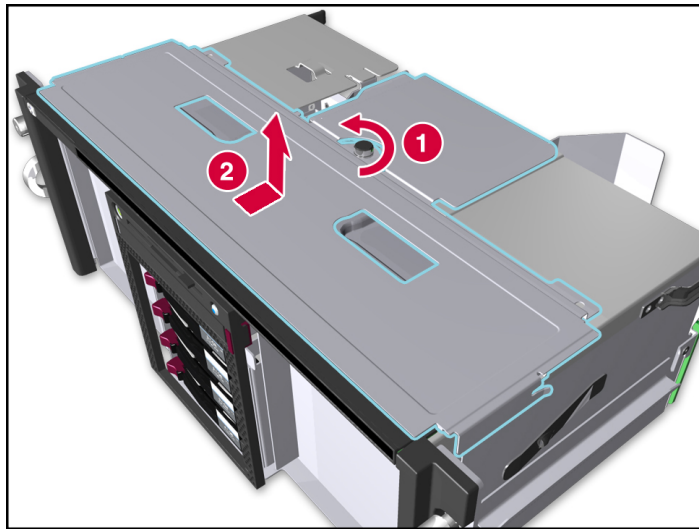

Figure 5-11: Removing the power and media module cover

3. Remove the LED bezel by lifting it off the chassis (1).

4. Disconnect the two LED signal cables by gently lifting the cable clamps (2), and then sliding the released cables out of the connector (3).

5. Pull the LED signal cables clear of the top of the power and media module. This provides access to the thumbscrew and cables connected to the removable media assembly.

**CAUTION:** The LED signal cable connector clamps can be broken if forced open.
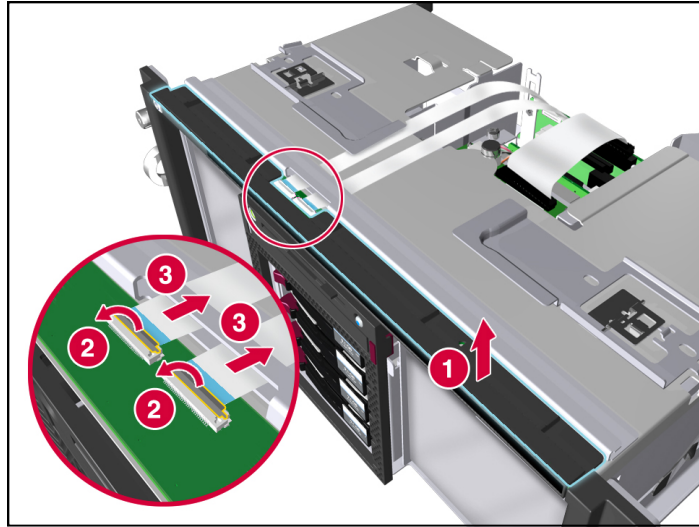
Figure 5-12: Removing the LED bezel and LED signal cables

6. Disconnect the DVD/CD-ROM/diskette drive signal cable from the device interface board (1).

7. Disconnect the media drive bay and SCSI hard drive power cable from the device interface board (2).

8. Disconnect the Power On/Standby/UID switch cable from the midplane (3).
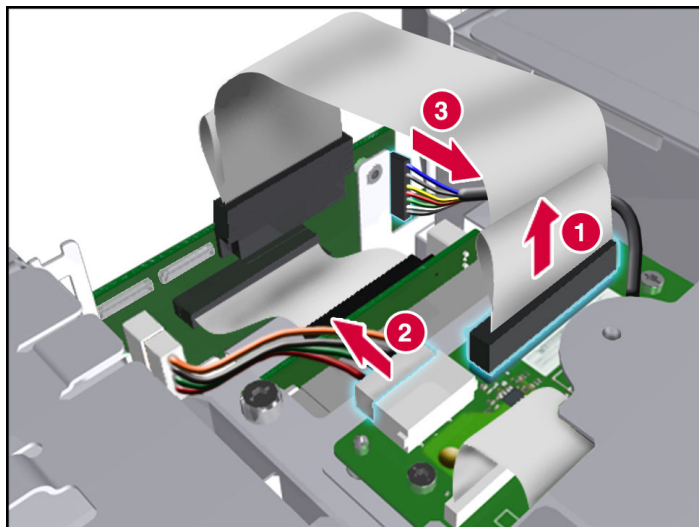
Figure 5-13: Disconnecting the drive and power cables

9. Remove the power and media module bezel. Refer to "Power and Media Module Bezel" in this chapter.

10. Loosen the thumbscrew to release the removable media assembly (1).

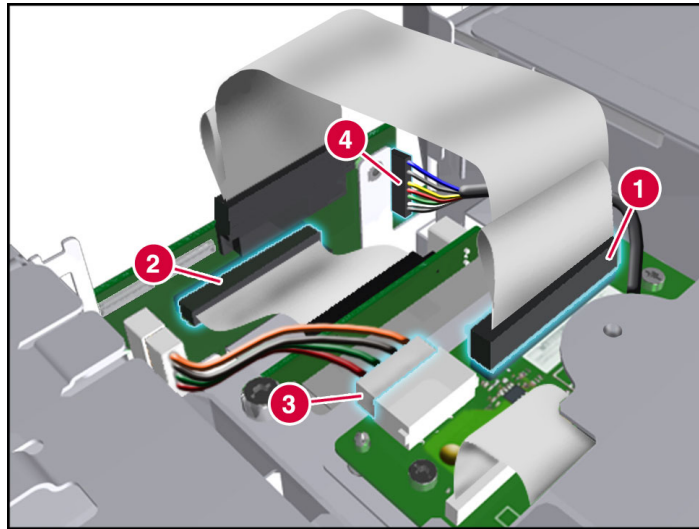11. Push the removable media assembly through the front of the module (2).
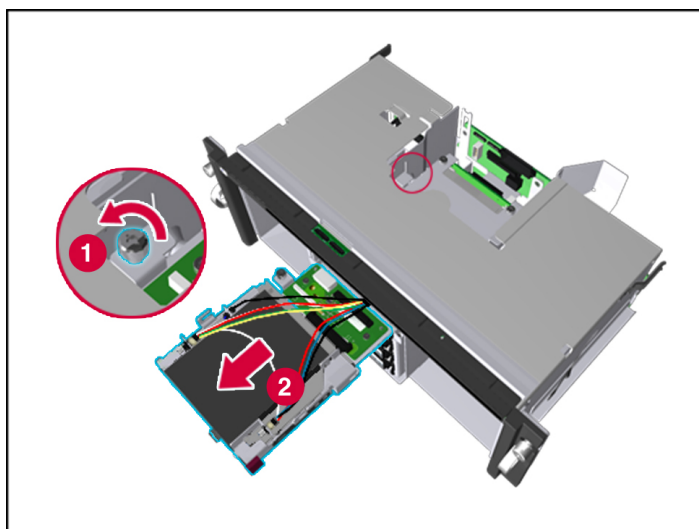
Figure 5-14: Removing the removable media assembly

Reverse steps 1 through 11 to replace the removable media assembly.

Power and Media Module Cable Routing Diagram

Figure 5-15: Power and media module cable routing

Item	Description
1	DVD/CD-ROM/Diskette drive signal cable
2	SCSI hard drive signal cable
3	Media drive bay and SCSI hard drive power cable
4	Power On/Standby/LED/UID/switch assembly cable

6

Diagnostic Tools

This chapter provides an overview of the software and firmware diagnostic tools available for the HP ProLiant DL740 server.

Diagnostic Tools Utility Overview

The following utilities were developed to assist in diagnosing problems, testing the hardware, and monitoring and managing HP server hardware.

Table 6-1: Diagnostic Tools

Tool	What it is	How to run it
Enterprise Diagnostics LX 32 Utility	This utility assists in testing and verifying operation of HP hardware. If problems are found, Diagnostics isolates failures down to a replaceable part, whenever possible.	Diagnostics and utilities are located on the system partition of the hard drive and must be accessed when a system configuration error is detected during the Power-On Self-Test (POST). For a complete list of POST error messages, refer to the *HP Servers Troubleshooting Guide*.

Run Enterprise Diagnostic LX32 Utility from the SmartStart 6.2 (or greater) CD. From the Maintenance tab select Launch Server Diagnostics Utility. |
| System Maintenance Menu | The System Maintenance Menu has the option to run the following utilities:

• **Setup Utility**—Runs the RO M-Based Setup Utility (RBSU).

• **Inspect Utility**—Runs the em bedded inspection utility. Use this utility to view system information and save it to a file on a diskette.

• **ROM Diagnostic Utility**—Runs the embedded ROM Diagnostic Utility. This utility includes the ROM Memory Diagnostic, CPU Diagnostic, and Boot Disk Diagnostic tests. | The System Maintenance Menu can be run by pressing the **F10** key at the end of system boot, just prior to the operating system loading from the hard disk. For more information, refer to the *HP ProLiant DL740 User Guide.* |
| Insight Manager 7 | This client/server application remotely manages HP hardware in a network environment, reports hardware fault conditions (both failure and prefailure) and collects data for reporting and graphing. | For more information, refer to the Management CD and the *Insight Manager User Guide*. |

continued

Table 6-1: Diagnostic Tools *continued*

Tool	What it is	How to run it
Survey Utility	This online information-gathering agent runs on servers, gathering critical hardware and software information from various sources. It is utility for servers running Windows NT or NetWare.	Install the Survey Utility from SmartStart, the Integration Maintenance Utility, or the Management CD.
	If a significant change occurs between data gathering intervals, previous information is marked, and the survey text file is overwritten to reflect the latest configuration and changes since last configuration. This process creates a historical record of change events for server hardware and software.	
ROM-Based Setup Utility (RBSU)	The RBSU allows you to change the system configuration settings from the initial startup of the system. Specifically, it provides: • "Virtual Presence" allowing a system administrator to use the Remote Insight Lights-Out Edition to remotely access and configure the system in an unattended fashion. • The ability to immediately save settings. • Selection of operating system. It also allows configuration of system-specific options such as COM ports and LPT ports, standard boot order, and NUMLOCK. • Viewing of installed PCI devices and the ability to configure IRQ (interrupt) settings for each installed PCI device. • Viewing and changing of the system date and time. • Viewing and setting of configuration options for Automatic Server Recovery (ASR). • The ability for the server passwords to be set or changed. • Setting of advanced options such as MPS/APIC Mode, Hot-plug Reservation, and CPU Correction Marking. • Selection of the language for RBSU (English, French, Italian, German, Spanish, or Japanese).	On an unconfigured server, powering up the server causes RBSU to run automatically. On an already configured server, pressing the **F9** key when prompted after restarting the server will cause RBSU to run.

continued

Table 6-1: Diagnostic Tools *continued*

Tool	What it is	How to run it
Array Diagnostics Utility (ADU)	ADU is a Windows-based tool designed to run on all HP systems that support HP array controllers. The two main functions of ADU are: • To collect all possible information about the array controllers in the system. • To generate a list of detected problems. This tool is available for all HP servers covered by this guide.	Use the information provided in the Array Diagnostics Utility (ADU). For a complete list of ADU error messages, see the *HP Servers Troubleshooting Guide.*
Drive Array Advanced Diagnostics (DAAD)	The predecessor to ADU, DAAD is a DOS-based tool for HP servers with Smart Array controllers. DAAD collects information about the array controllers in the system and offers a list of detected problems.	For a list of HP servers still supported by this tool, visit the HP website: www.hp.com
Integrated Management Log (IML)	IML is a log of system events, such as system failures or nonfatal error conditions. View events in the IML from within: • Insight Manager • Survey Utility • Operating system-specific IML utilities	The IML requires HP operating system-dependent drivers. Refer to the Support Software CD for instructions on installing the appropriate drivers.

For More Information

For detailed information about each of these diagnostic tools, refer to the *HP Servers Troubleshooting Guide*.

For detailed information on troubleshooting the HP ProLiant DL740 server, refer to the *HP ProLiant DL740 Server User Guide.*

For detailed information about the RBSU, refer to the *ROM-Based Setup Utility User Guide* on the Documentation CD.

7

Connectors, Switches, and LED Indicators

Connectors

This section contains graphics and tables that show the connector locations on the HP ProLiant DL740 server.

Rear Panel Connectors

Connect any peripheral devices to the connectors located on the rear of the server. Figure 7-1 identifies the peripheral connectors on the back of the server.

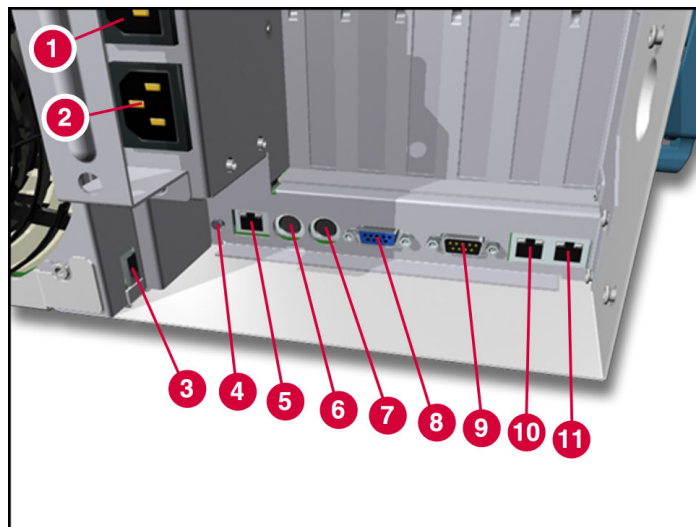> ⚠ **WARNING: To reduce the risk of electrical shock or fire, do not plug telecommunications/telephone connectors into the NIC connectors.**

Figure 7-1: Rear panel connectors

Table 7-1: Rear Panel Connectors

Item	Description
1	AC power port
2	AC power port
3	USB port
4	UID LED/Switch
5	iLO port
6	Keyboard connector
7	Mouse connector
8	Video port
9	Serial connector
10	NIC port 2
11	NIC port 1

System Board

The system board is located in the bottom of the host module. Refer to Figure 7-2 to identify components on the system board.
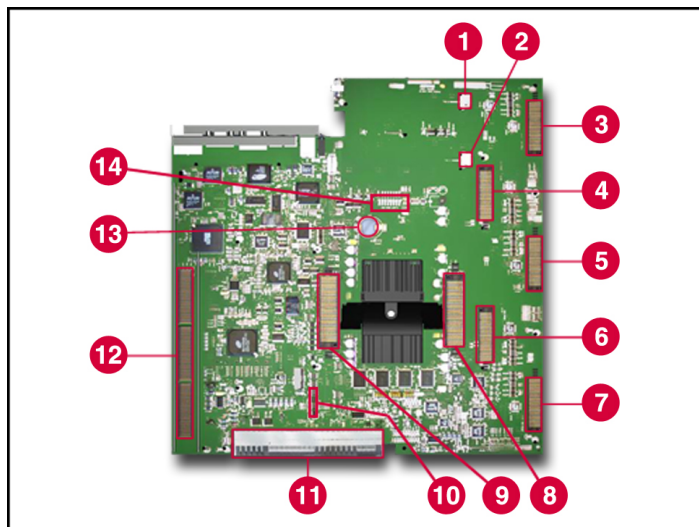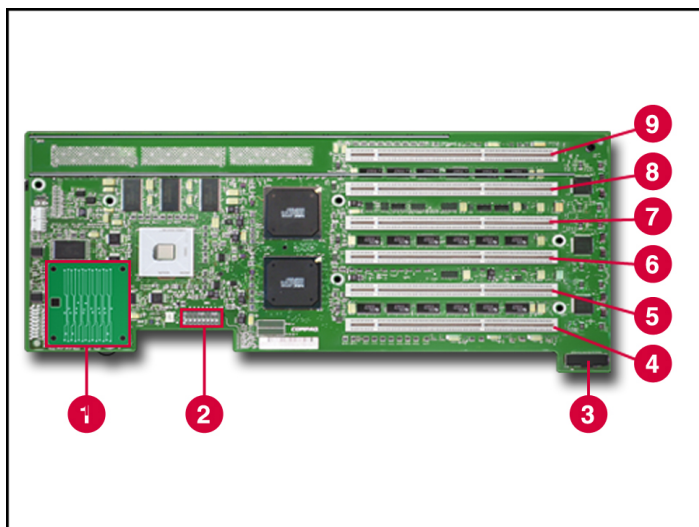

Figure 7-2: System board components

Item	Description
1	Fan 2 connector
2	Fan 1 connector
3	Memory cartridge 1 connector
4	Memory cartridge 2 connector
5	Memory cartridge 3 connector
6	Memory cartridge 4 connector
7	Memory cartridge 5 connector
8	Processor board 2 connector
9	Processor board 1 connector
10	Remote Insight board connector
11	System/midplane board connector
12	I/O board connector
13	System battery
14	iLO diagnostic LEDs

I/O Board Components

Figure 7-3: I/O board components

| Item	Description
1	Array enabler board
2	I/O board switch bank (SW7)
3	PCI-X hot-plug cable connector
4	PCI-X slot 1
5	PCI-X slot 2
6	PCI-X slot 3
7	PCI-X slot 4
8	PCI-X slot 5
9	PCI-X slot 6

The operating system detects PCI devices in the following slot order: 5-6-1-2-3-4.

Switches

This section contains graphics and tables showing switch location and settings for the host board.

I/O Board Configuration Switches

The I/O board switch bank is located on the inside edge of the I/O board near the Array Enabler board and I/O expansion slots 1 and 2.
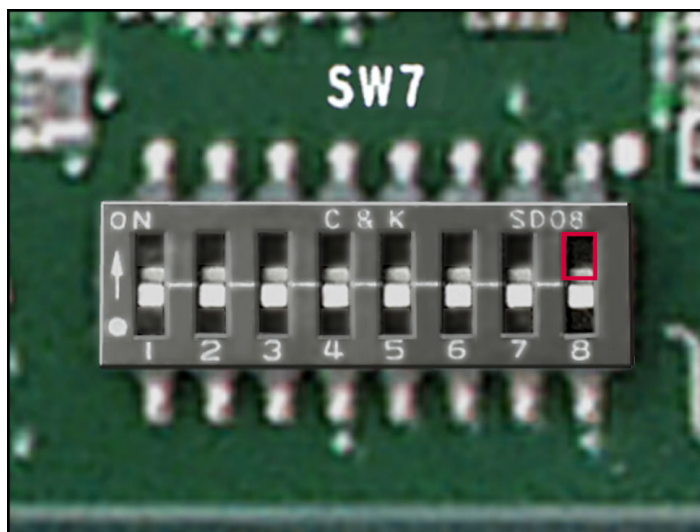
Figure 7-4: I/O board switch bank

Table 7-2: I/O Board Configuration Switch Settings (SW7)

Switch	Function	Enable	Disable	Default
S1	On-board video	Off	On	Off
S2	Configuration lock	On	Off	Off
S3	Rack-mount	Reserved	Reserved	Off
S4	Diskette boot override	On	Off	Off
S5	Boot password	Off	On	Off
S6	Clear NVRAM	On	Off	Off
S7	Select Redundant BootBlock ROM	On	Off	Off
S8	iLO security jumper	On	Off	Off

* The server serial number must be re-entered through RBSU after you clear the NVRAM. Refer to the "Re-entering the Server Serial Number" section in Chapter 2.

LED Indicators

Status LEDs are located on the front, back, and inside of the server. These LEDs communicate the current status of varying aspects of the components and operations, aiding you in diagnosing problems. The following ProLiant DL740 server LEDs are explained in this chapter.

- System power LED switch—Located in the server Power On/Standby button

- Unit identification LED switches—Located on the front and back of the server

- System interconnect LEDs—Located on the front, top left edge of the server

- System attention LEDs—Located on the front, top left edge of the server

- System activity LEDs—Located on the front, top left edge of the server

- Hot-plug SCSI hard drive LEDs—Located on the front of each hard drive

- Power supply LEDs—Located on the lower front of each power supply

- Hot-plug fan LEDs—Located on the host board near each fan inside the server

- PCI Hot Plug LEDs—Located on the rear of the server and inside the host module

- Memory cartridge LEDs—Located on the memory cartridges

- DIMM status LEDs—Located on the front right top edge of the server

System Power LED Switch

Figure 7-5 shows the location of the system power LED switch.
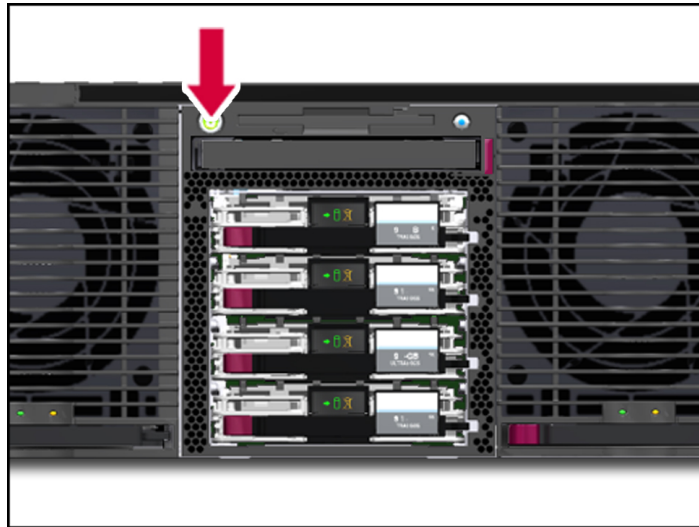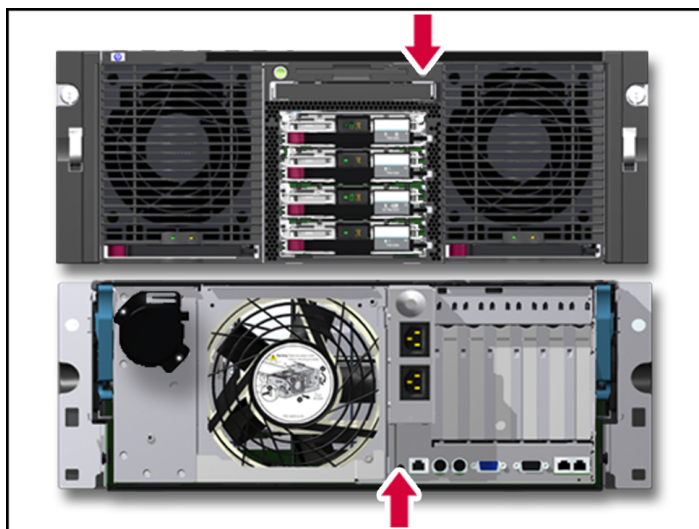

Figure 7-5: System power LED switch

Unit Identification LED Switches (Front and Rear)

The ProLiant DL740 server offers Unit Identification (UID) LED switches to aid in identifying specific servers in a rack environment. Each ProLiant DL740 server has two unit identification switches, one on the front of the server and one on the back of the server. When activated from the front of the server, the Front UID switch illuminates two LEDs. An LED on the front of the server indicates that the switch is activated and an LED on the rear of the server provides a visual reference for service personnel. When moving between the front and rear of a rack filled with ProLiant DL740 servers, you can use the unit identification switches to quickly identify one or more servers that require service or maintenance.

Figure 7-6 displays the locations of the UID LED switch on the front and rear of the server.

Figure 7-6: Locating the UID LED switches

System Interconnect LED Indicators

To prevent damage to critical system components, the ProLiant DL740 server will not power up if it detects that certain components are not installed or are installed incorrectly. The system interconnect LEDs provided with ProLiant DL740 servers provide a closed-loop checking mechanism for verifying proper component mating and interconnections between critical server components. LEDs provide visual assistance in isolating components to check if the server will not power up due to a component or module that is not fully installed. If a status indicator light is on, reseat the component represented by the indicator. Refer to the hood labels for component location.

IMPORTANT: To check system interconnect status LEDs, place the server in Standby with the power supplies plugged in.
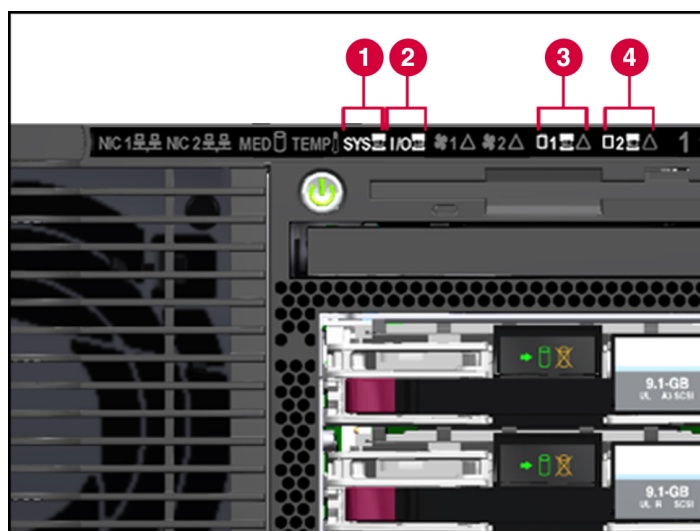
Figure 7-7: System interconnect LEDs

Item	Description
1	System interconnect
2	I/O board interconnect
3	Processor board 1 interconnect
4	Processor board 2 interconnect

System Attention LED Indicators
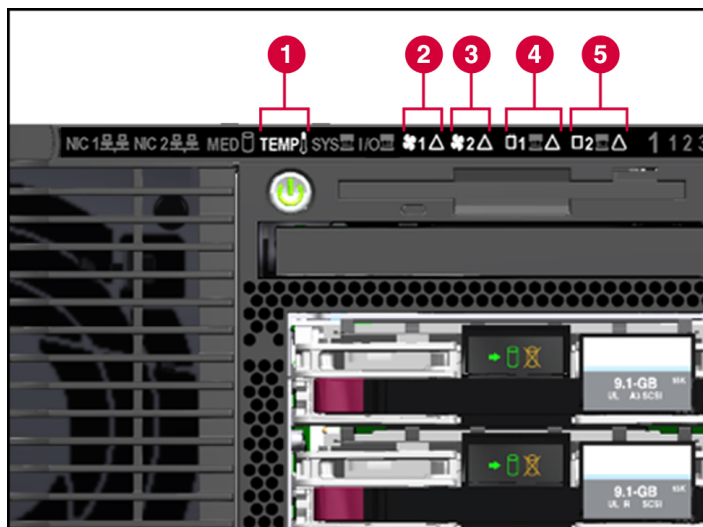
Figure 7-8: System attention LEDs

Item	Description
1	Temperature attention
2	Hot-plug fan 1 attention
3	Hot-plug fan 2 attention
4	Processor board 1 attention
5	Processor board 2 attention

The temperature attention LED has two possible states:

- Amber LED—The first temperature threshold has been reached. Fans are at high speed. If the server location is at a normal temperature, check the health driver to determine which sensor has tripped, and check the server to see if action is necessary.

- Red LED—The server is off because it reached an overtemperature state on one of its sensors, and shut down to protect hardware. Check the health driver or Insight Manager to determine which thermal sensor shut down.

System Activity LED Indicators
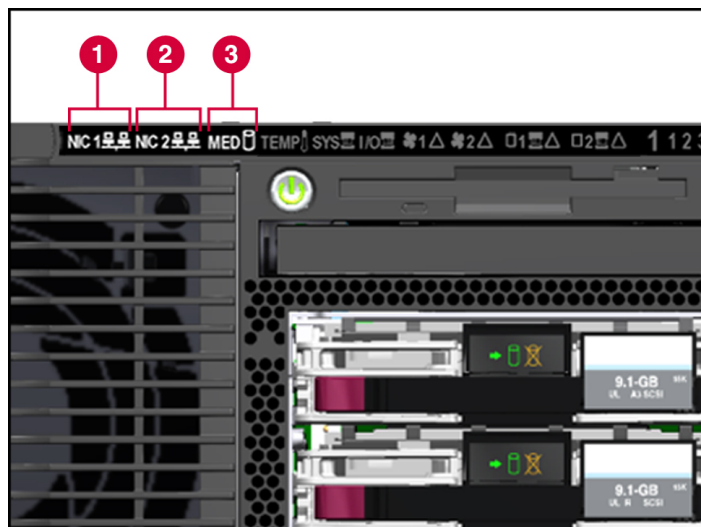
Figure 7-9: System activity LEDs

Item	Description
1	NIC 1 link status activity LED
2	NIC 2 link status activity LED
3	DVD/CD-ROM activity LED

Hot-Plug SCSI Hard Drive LED Indicators

The hot-plug SCSI hard drive LEDs, located on each physical drive, are visible on the front of the server or external storage unit. They provide: (1) Activity, (2) Power/Online, and (3) Fault status for each corresponding drive when configured as a part of an array and attached to a powered-on controller. Their behavior might vary, depending on the status of other drives in the array.
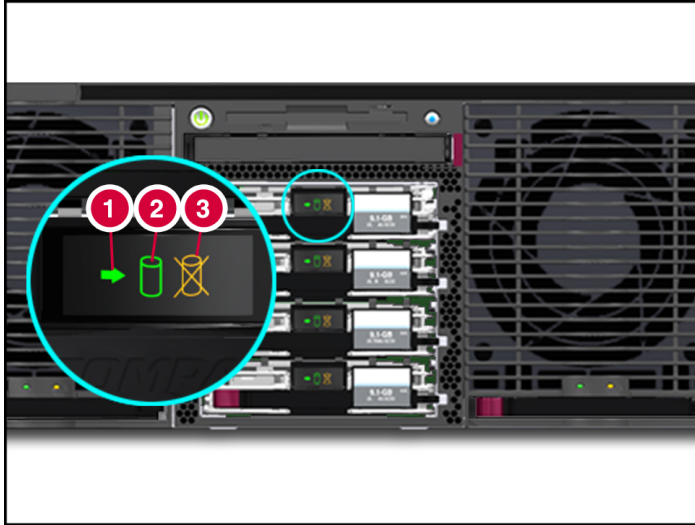
Figure 7-10: Hot-plug SCSI hard drive LEDs
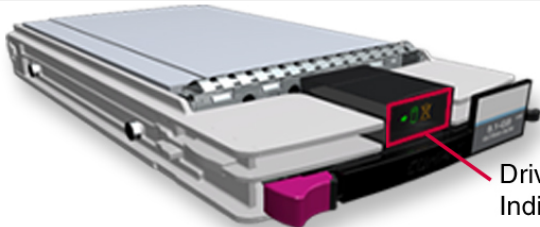
Drive
Indicators

	Do not remove the drive. Removing the drive during this process will cause data loss. The drive is being accessed and is not configured as part of an array.
	Do not remove the drive. Removing the drive during this process will cause data loss. The drive is rebuilding or undergoing capacity expansion.
	Do not remove the drive. Removing the drive during this process will cause data loss. The drive is part of an array being selected by the Array Configuration Utility. -Or- The options ROMpaq is upgrading the drive.
	OK to replace the drive online if a predictive failure alert is received and the drive is attached to an array controller. The drive is not configured as part of an array. -Or- If this drive is part of an array, then a powered-on controller is not accessing the drive. -Or- The drive is configured as an online spare.
	OK to replace the drive online. The drive has failed, and has been placed off-line.
	OK to replace the drive online if a predictive failure alert is received, provided the array is configured for fault tolerance and all other drives in the array are online. The drive is online and configured as part of an array.
	OK to replace the drive online if a predictive failure alert is received, provided the array is configured for fault tolerance and all other drives in the array are online. The drive is online and configured as part of an array.
	OK to replace the drive online if a predictive failure alert is received, provided the array is configured for fault tolerance and all other drives in the array are online. The drive is online and configured as part of an array.
▮ OFF ▯ Online ➡ Drive Access ✗ Drive Failure	

Figure 7-11: SCSI hard drive LEDs

Power Supply LED Indicators

Each power supply has status and AC power LEDs. See Figure 7-12 and Table 7-3 for a detailed description of both indicators.
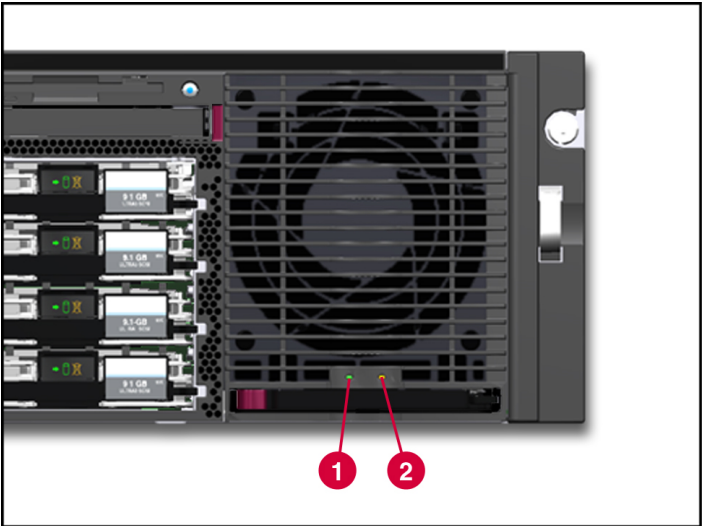

Figure 7-12: Power supply LEDs

Table 7-3: Power Supply LEDs

Item	Condition	Meaning
1 AC Power	Green blinking	AC power is connected to this power supply. System is in standby mode.
	Green	Normal operation.
	Off	No AC power.
2 Attention	Amber	Fault detected in this power supply. Must replace power supply. -or- No AC power plugged into corresponding rear AC power port.
	Amber blinking	Power supply is in current limit mode.
	Off	Normal operation.

Hot-Plug Fan LED Indicators

The ProLiant DL740 server ships with two hot-plug fans. Fan 1 is closest to the front of the server. Each fan has an arrow-shaped status LED that indicates the status of the fan the arrow is pointing to. Figure 7-13 shows an example of the hot-plug fan status LEDs:

- Hot-plug fan 1 LED (1)—In this case, the LED is amber, which means that the fan needs attention or is not installed.

- Hot-plug fan 2 LED (2)—In this case, the LED is green, which means that the fan is installed and working properly.
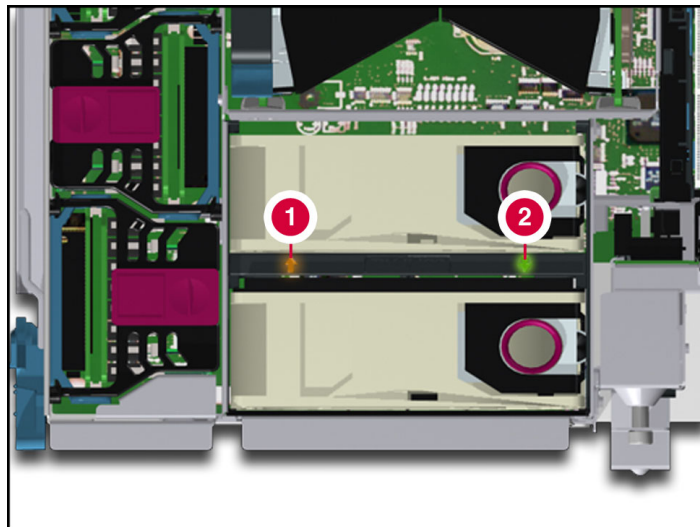
Figure 7-13: Hot-plug fan LEDs

> ⚠ **CAUTION:** Never remove both hot-plug fans while the server is powered up. Overheating and damage to hardware could result. If the appropriate HP software drivers are installed, the operating system software will initiate a power shutdown if overheated.

NOTE: The hot-plug fan LEDs are not part of the fan housing. Figure 7-13 shows the LEDs as if the fan were installed in the server.

PCI Hot Plug LED Indicators

The PCI Hot Plug amber and green LEDs provide a visual reference on the status of each slot. The LEDs are viewed from the rear of the server, as shown in Figure 7-14, or by opening the top access panels, as shown in Figure 7-15.
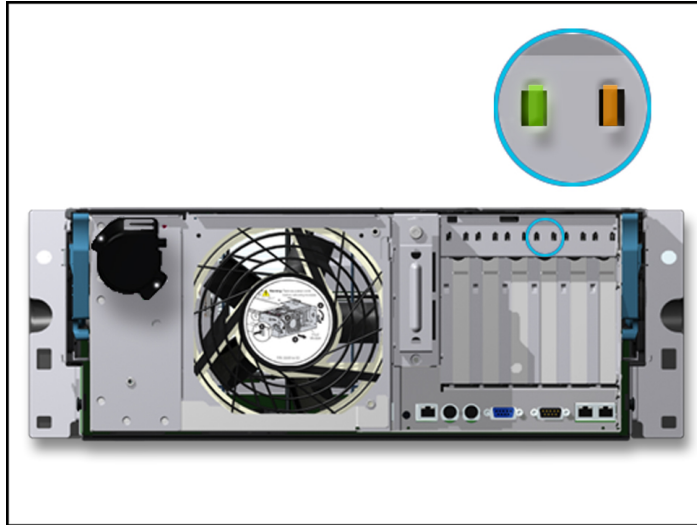
Figure 7-14: PCI Hot Plug LEDs from the rear of the server
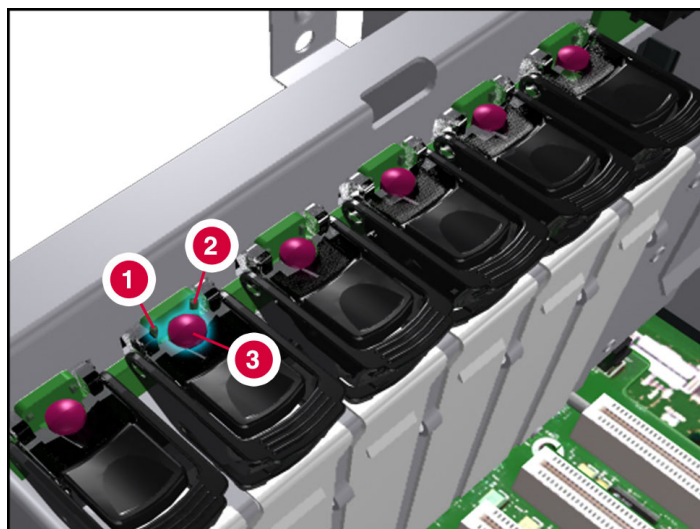
Figure 7-15: PCI Hot Plug LEDs in the host module

A description and slot status for the PCI Hot Plug LEDs and button shown in Figure 7-15 are provided in Table 7-4.

Table 7-4: PCI Hot Plug LEDs and Button

	Amber LED	**OK to Open**	**Slot Condition and Status**
	Off		Slot does not require attention.
1	On		Slot requires attention. There could be a problem with the slot, the PCI board, or the driver. Check the green LED before opening the slot.
			Refer to the IML and/or the PCI Hot Plug software application for a description of the problem indicated.

	Green LED	**OK to Open**	**Slot Condition and Status**
	On	No	Power is applied to the slot.
2	Blinking	No	Power to the slot is being turned off or on. This process could take several minutes. Do **not** open the slot release lever until the green LED is completely off.
	Off	Yes	You can replace or remove the board in this slot only.
3	**PCI Hot Plug Button**		Each PCI Hot Plug button is used to activate or deactivate its associated PCI Hot Plug slot. Activating or deactivating a PCI Hot Plug slot can also be accomplished through the operating system PCI Hot Plug software application.

Memory Cartridge LED Indicators

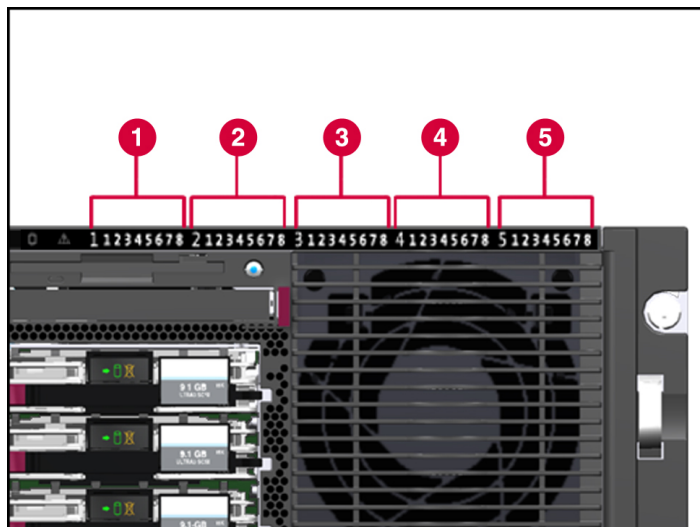Each memory cartridge has two LEDs that indicate its status.
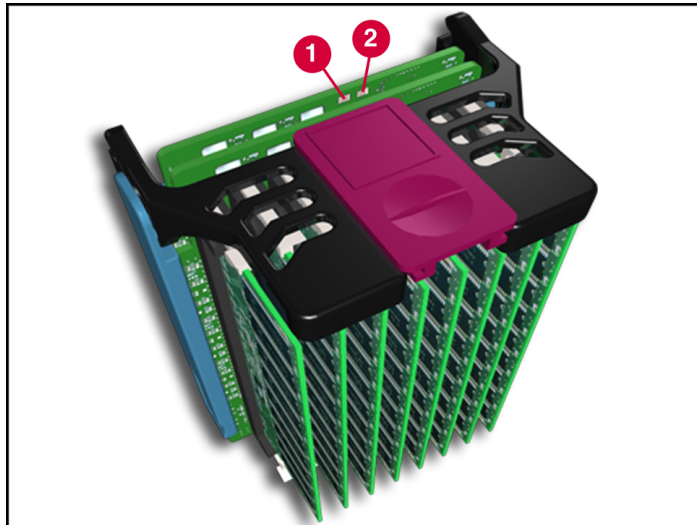
Figure 7-16: Memory cartridge LEDs

Item	Description
1	Cartridge attention LED
2	Cartridge power LED

DIMM Status LED Indicators

The ProLiant DL740 server has LEDs for each DIMM in the five memory cartridges. These LEDs are used to determine the status of memory installed in the server.

Figure 7-17: DIMM status LEDs

Table 7-5: DIMM status LEDs

Item	LED Indicator	LED Icon
1	Cartridge 1 DIMM status LEDs	**1 2 3 4 5 6 7 8**
2	Cartridge 2 DIMM status LEDs	**1 2 3 4 5 6 7 8**
3	Cartridge 3 DIMM status LEDs	**1 2 3 4 5 6 7 8**
4	Cartridge 4 DIMM status LEDs	**1 2 3 4 5 6 7 8**
5	Cartridge 5 DIMM status LEDs	**1 2 3 4 5 6 7 8**

LED Indicator State Definitions

Table 7-6 provides descriptions of the possible LED states of the memory cartridges.

Table 7-6: Memory Cartridge LED State Definitions

LED Indicator	State	Condition	Action
Cartridge Power LED (green)	Solid	Cartridge online (normal)	None
	Off	Cartridge not online	Lock cartridge or check other LEDs
	Blinking	Cartridge rebuild and verify in progress	Wait until LED stops blinking
Cartridge Attention LED (amber)	Off	Normal	None
	Solid (No DIMM status LED)	Power fault detected	Replace cartridge
	Solid (DIMM status LED solid)	ECC error	Replace DIMMs
	Blinking	Power fault detected	Replace cartridge or shorted DIMM
	Blinking with cartridge power LED solid (alarm sounds)	Cartridge online but unlocked (other cartridges might need attention)	Lock cartridge and do not remove
DIMM Status LED (amber)	Off	Normal	None
	Solid	ECC error	Replace DIMMs
	Blinking	Configuration error	Remove cartridge and fix error
	Blinking with cartridge power LED solid	DIMM installed but not available to the operating system (hot-add/upgrade in progress)	Complete hot-add/upgrade operation on remaining cartridges

8

Physical, Operating, and Performance Specifications

This section provides physical, operating, and performance specifications for the following components of the HP ProLiant DL740 server:

- Server
- Power supply
- Dual inline memory module (DIMM)
- 1.44-MB diskette drive
- DVD-ROM Drive
- 24X Max IDE CD-ROM drive
- Hot-pluggable Wide Ultra3 and U320 SCSI hard drives
- Smart Array 5i Controller
- NC7781 PCI-X Gigabit Server Adapter

Server Specifications

Table 8-1: HP ProLiant DL740 Server Specifications

Dimensions	
Height	30.5 cm (12.0 in)
Depth	68.5 cm (27.0 in)
Width	44.5 cm (17.5 in)
Weight (no drives and two power supplies)	56.7 kg (125 lb)
Input Requirements (per power supply)	**Low Range/High Range**
Rated Input Voltage	100 to 120 V/200 to 240 V
Rated Input Frequency	50 to 60 Hz/50 to 60 Hz
Rated Input Current	8 A/10 A
Power Supply Output Power (per power supply)	**Low Range/High Range**
Rated Steady-State Power	800 W/1150 W
Maximum Peak Power	800 W/1150 W
Temperature Range	
Operating	10° to 35° C* (50° to 95° F)
Shipping	-30° to 60° C (-22° to 122° F)
Relative Humidity (noncondensing)	
Operating	10% to 90%/10% to 90%
Nonoperating	5% to 90%/5% to 90%
Maximum Wet Bulb Temperature	38.7° C (101.7° F)
* Altitude derating: °C/1000 ft to 10,000 feet	

Power Supply Specification

Table 8-2: Power Supply Specifications

General specifications	
Full output rating	To 40° C and 1,525 m (to 104° F and 5,000 ft)
	To 32° C and 3,050 m (to 90° F and 10,000 ft) (derate linearly)
Minimum load	1.0 A on + 5 V output 1.0 A on + 12 V output 0.5 A on + 3.3 V output
Ambient temperature range	
Operating	10° to 40° C (50° to 104° F)
Storage	-40° to 65° C (-40° to 149° F)
Input specifications	**Low Range/High Range**
Nominal line voltage	100 to 120 VAC/200 to 240 VAC
Range input line	90 to 132 VAC/180 to 265 VAC
Frequency range	47 to 63 Hz/47 to 63 Hz
Power factor	0.95/0.95
Input power	800 W @ 110 V/1100 W @ 220 V
Input current	8 A at 100 VAC/10 A at 200 VAC
Inrush current	<70 A at 132 VAC (cold start)/<70 A at 132 VAC (cold start)
Holdup time	20 ms from zero crossing at 120 VAC/20 ms from zero crossing at 120 VAC
Dielectric voltage withstand	
Input to output	3000 VAC per minute/3000 VAC per minute
Input to ground	1500 VAC per minute/1500 VAC per minute
Input transient susceptibility	
Common and differential mode (superimposed on AC line)	2500 V, 10 µs pulse
Differential mode	20% step change in AC input voltage

Dual Inline Memory Module Specifications

Table 8-3: DIMM Specifications

Size	256 MB, 512 MB, or 1 GB
Speed	60 ns or faster
Upgrade requirement	Bank of two DIMMs; must be same type, size, speed, and manufacturer
Type	Buffered ECC protected DIMMs; SDRAM

1.44-MB Diskette Drive

Table 8-4: Diskette Drive Specifications

Size	3.5 in
LED indicators (front panel)	Green
Read/write capacity per diskette (high/low density)	1.44 MB/720 KB
Drives supported	1
Drive height	1/3
Drive rotation	300 rpm
Transfer rate bits per sec (high/low)	500/250 K
Bytes per sector	512
Sectors per track (high/low)	18/9
Tracks per side (high/low)	80/80
Access times	
Track-to-track (high/low)	6 ms/3 ms
Average (high/low)	174 ms/94 ms
Settling time	15 ms
Latency average (high/low)	100 ms/83 ms
Cylinders (high/low)	80/80
Read/write heads	2

DVD-ROM Drive

Table 8-5: DVD-ROM Drive Specifications

Dimensions	
Height	4.29 cm (1.69 in)
Width	15.0 cm (5.75 in)
Depth	20.8 cm (8.19 in)
Weight	1200 g (2.66 lb)
Operating conditions	
Temperature	5° to 45° C (41° to 113° F)
Humidity	10% to 80%
Applicable disk	CD-ROM (mode 1 and 2), CD-DA, CD-XA (mode 2, form 1 and 2), photo CD (single-session and multi-session), mixed mode (audio and data combined)
Capacity	550 MB (mode 1, 12 cm) 640 MB (mode 2, 12 cm)
Block size	2048, 1024 bytes (mode 1) 2340, 2336, 1024 bytes (mode 2) 2352 bytes (CD-DA) 2328 bytes (CD-XA)
Diameter	12 cm, 8 cm (4.7 in, 3.15 in)
Rotational speed	4200 rpm maximum
Center hole thickness	15 mm (0.6 in)
Track pitch	1.6 μm
Data transfer rate	
Sustained	150 KB/s (single)
Variable	1200-3600 KB/s (8X to 24X)
Data transfer method	32-bit bus master PCI
Access times (typical)	
Full stroke	200 ms
Random	100 ms
Cache/buffer	128 KB
Startup time (typical)	> 7 s
Stop time	> 4 s
Audio output level	
Line out	0.7 VRMS at 47 Ohms
Headphone	0.6 VRMS at 32 Ohms (maximum width)

continued

Table 8-5: DVD-ROM Drive Specifications *continued*

Laser parameters	
Type	Semiconductor laser GaA1As
Wave length	780 +/- 25 nm
Divergence angle	53.5° +/- 1.5°
Output power	0.14 mW
Interface	IDE (ATAPI)

24X Max IDE CD-ROM Drive

Table 8-6: 24X Max IDE CD-ROM Drive Specifications

Dimensions	
Height	4.29 cm (1.69 in)
Width	15.0 cm (5.75 in)
Depth	20.8 cm (8.19 in)
Weight	1200 g (2.66 lb)
Operating conditions	
Temperature	5° to 45° C (41° to 113° F)
Humidity	10% to 80%
Applicable disk	CD-ROM (mode 1 and 2), CD-DA, CD-XA (mode 2, form 1 and 2), photo CD (single-session and multi-session), mixed mode (audio and data combined)
Capacity	550 MB (mode 1, 12 cm) 640 MB (mode 2, 12 cm)
Block size	2048, 1024 bytes (mode 1) 2340, 2336, 1024 bytes (mode 2) 2352 bytes (CD-DA) 2328 bytes (CD-XA)
Diameter	12 cm, 8 cm (4.7 in, 3.15 in)
Rotational speed	4200 rpm maximum
Center hole thickness	15 mm (0.6 in)
Track pitch	1.6 μm
Data transfer rate	
Sustained	150 KB/s (single)
Variable	1200-3600 KB/s (8X to 24X)
Data transfer method	32-bit bus master PCI

continued

Table 8-6: 24X Max IDE CD-ROM Drive Specifications *continued*

Access times (typical)	
Full stroke	200 ms
Random	100 ms
Cache/buffer	128 KB
Startup time (typical)	> 7 s
Stop time	> 4 s
Audio output level	
Line out	0.7 VRMS at 47 Ohms
Headphone	0.6 VRMS at 32 Ohms (maximum width)
Laser parameters	
Type	Semiconductor laser GaA1As
Wave length	780 +/- 25 nm
Divergence angle	53.5° +/- 1.5°
Output power	0.14 mW
Interface	IDE (ATAPI)

Hot-Plug U320 SCSI Hard Drives

Table 8-6: Hot-Plug U320 SCSI Hard Drives

	36.4-GB	**72.8-GB**	**146.8-GB**	**18.2-GB**	**36.4-GB**	**72.8-GB**
Capacity	36419.3 MB	72839.1 MB	146815.7 MB	18209.3 MB	36419.3 MB	72839.1 MB
Height	1.0 in	1.0 in	1.0 in	1.0 in	1.0 in	1.0 in
Size	3.5 in	3.5 in	3.5 in	3.5 in	3.5 in	3.5 in
Interface	Wide-Ultra 320 SCSI	Wide-Ultra 320 SCSI	Wide-Ultra 320 SCSI	Wide-Ultra 320 SCSI	Wide-Ultra 320 SCSI	Wide-Ultra 320 SCSI
Transfer rate	320 MB/s	320 MB/s	320 MB/s	320 MB/s	320 MB/s	320 MB/s
Seek time (typical, including setting)						
Single track	0.55 ms	0.55 ms	0.55 ms	0.40 ms	0.40 ms	0.40 ms
Average	4.90 ms	4.90 ms	4.90 ms	3.80 ms	3.80 ms	3.80 ms
Full stroke	9.20 ms	9.20 ms	9.20 ms	6.70 ms	6.70 ms	6.70 ms
Rotational speed	10,000 rpm	10,000 rpm	10,000 rpm	15,000 rpm	15,000 rpm	15,000 rpm
Physical configuration						
Bytes/Sector	512	512	512	512	512	512
Logical blocks	71,131,999	142,263,999	286,749,487	17,773,524	35,565,080	142,263,999
Operating temperature	5° to 55° C (41° to 131° F)	5° to 55° C (41° to 131° F)	5° to 55° C (41° to 131° F)	5° to 55° C (41° to 131°F)	5° to 55° C (41° to 131° F)	5° to 55°C (41° to 131° F)

Hot-Plug Ultra3 SCSI Hard Drives

Table 8-8: Hot-Plug Ultra3 SCSI Hard Drives

	18.2-GB	**36.4-GB**	**18.2-GB**
Capacity	18209.3 MB	36419.3 MB	18209.3 MB
Height	1.0 in	1.0 in	1.0 in
Size	3.5 in	3.5 in	3.5 in
Interface	Wide-Ultra3 SCSI	Wide-Ultra3 SCSI	Wide-Ultra3 SCSI
Transfer rate	160 MB/s	160 MB/s	160 MB/s
Seek time (typical, including setting)			
Single track	0.8 ms	0.9 ms	0.7 ms
Average	5.2 ms	5.7 ms	3.9 ms
Full stroke	12.0 ms	12.0 ms	12.0 ms
Rotational speed	10,000 rpm	10,000 rpm	15,000 rpm
Physical configuration			
Bytes/sector	512	512	512
Logical blocks	35,565,080	17,773,524	35,565,080
Operating temperature	10° to 35° C (50° to 95° F)	10° to 35° C (50° to 95° F)	10° to 35° C (50° to 95° F)

Smart Array 5i Controller

Table 8-9: Smart Array 5i Controller Specifications

Temperature range	
Operating	10° to 35° C (50° to 95° F)
Shipping	-30° to 60° C (-22° to 140° F)
Relative humidity range (noncondensing)	
Operating	20% to 80%
Nonoperating	5% to 90%
Maximum drives supported	4
Logical drives supported	32
Simultaneous drive transfer channels	2
Data transfer method	32/64-bit PCI bus master interface
Total transfer rate	320 MB/s (160 MB/s per channel)
SCSI electrical interface	Low-voltage differential (LVD) and single-ended
PCI bus transfer rate (maximum)	160 MB/s
SCSI port connectors (internal/external)	68-pin Wide SCSI/VHDCI connector
Protocol	Wide Ultra2 and Wide Ultra3 SCSI
SCSI electrical interface	Low-voltage differential
Software upgradeable firmware	Yes
Read cache	32 MB
Reliability features	
Online capacity expansion	Yes
Logical drive capacity extension	Yes
Online RAID level migration	Yes
Online stripe size migration	Yes
Automatic data recovery	Yes
Distributed data guarding (RAID 5)	Yes
Data guarding (RAID 4)	No
Data mirroring (RAID 1)	Yes
Drive striping (RAID 0, 0+1)	Yes

NC7781 PCI-X Gigabit Server Adapter

Table 8-10: NC7781 PCI-X Gigabit Server Adapter

Network interface	10Base-T/100Base-TX
Compatibility	IEEE 802.3i, 802.3u, 802.3x, 802.3ab, 802.3ad compliant PCI-X 1.0, PCI 2.2, ACPI v1.1a
Data path	64/133 MHz, compatible with 64/100, 64/66, 66/33, and 32/33
Bus architecture	PCI-X bus mastering, compatible with existing PCI bus architecture
Network transfer rate	
10Base-T (half-duplex), 10Base-2	10 Mbps
10Base-T (full-duplex)	20 Mbps
100Base-TX (half-duplex)	100 Mbps
100Base-TX (full-duplex)	200 Mbps
1000Base-TX (half-duplex)	1000 Mbps
1000Base-TX (full-duplex)	2000 Mbps
Connector	RJ-45
I/O address and interrupt	Automatic configuration
Cable support	Category 5 or higher UTP; up to 100 m (328 ft)
Operating system driver support	Microsoft Windows Server 2003 Microsoft Windows 2000 Microsoft Windows NT 4.0 Novell NetWare Server 6 Caldera OpenUnix 8

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